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Ontario. Legislature assembly
Sessional papers

53

# SESSIONAL PAPERS.

## VOL. XXIX.—PART VI.

## THIRD SESSION EIGHTH LEGISLATURE

OF THE

## PROVINCE OF ONTARIO.

SESSION 1897.

*TORONTO:*
PRINTED FOR LUD. K. CAMERON, QUEEN'S PRINTER,
BY WARWICK BROS. & RUTTER, 68 AND 70 FRONT STREET WEST.
1897.

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| Agricultural Societies | 54 | *Not printed.* |
| Algonquin Park, Regulations | 67 | " |
| Arbitration, Provincial | 52 | " |
| Archæology, Report (*part of*) | 1 | *Printed.* |
| Asylums, Report | 10 | " |
| Bee-keepers' Association, Report | 20 | *Printed.* |
| Births, Marriages and Deaths, Report | 29 | " |
| Blind Institute, Report | 14 | " |
| Bonds and Securities | 45 | *Not printed.* |
| Central Prison Industries | 55 | *Not printed.* |
| Children's Court, Sittings, etc | 71 | " |
| Children's Protection Act, Report | 16 | *Printed.* |
| Common Gaols, Report | 11 | " |
| Crown Lands, Report | 4 | " |
| Dairymen and Creameries, Report | 22 | *Printed.* |
| Davidson, F. R. *re* Letter | 63 | *Not printed.* |
| Deaf and Dumb Institute, Report | 15 | *Printed.* |
| Dickinson, John, dismissal of | 65 | *Not printed.* |
| Division Courts, Report | 6 | *Printed.* |
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| Fruit Experiment Stations, Report | 27 | " |
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| Game Laws, Orders in Council | 62 | *Not printed.* |
| " Correspondence | 66 | " |
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| Health, Report | 34 | *Printed.* |
| Hospitals, Report | 13 | " |
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CONTENTS PART II.

No. 2.. Public Accounts of the Province for the year 1896. Presented to the Legislature, 16th February, 1897. *Printed.*

No. 3.. Estimates for the Service of the Province until after the Estimates of the year are finally passed. Presented to the Legislature, 12th February, 1897. *Not printed.* Estimates for the year 1897. Presented to the Legislature, 17th February, 1897. *Printed.* Estimates (Supplementary) for the year 1897. Presented to the Legislature, 9th April, 1897. *Printed.* Estimates (Supplementary) for the year 1897. Presented to the Legislature, 10th April, 1897. *Not printed.*

No. 4.. Report of the Commissioner of Crown Lands for the year 1896. Presented to the Legislature, 23rd March, 1897. *Printed.*

No. 5.. Report of the Department of Immigration for the year 1896. Presented to the Legislature, 15th March, 1897. *Printed.*

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No. 6.. Report of the Inspector of Division Courts for the year 1896. Presented to the Legislature, 9th March, 1897. *Printed.*

No. 7.. Report upon the working of the Tavern and Shop Licenses Acts for the year 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 8.. Report of the Commissioner of Public Works for the year 1896. Presented to the Legislature, 26th February, 1897. *Printed.*

No. 9.. Report of the Inspector of Insurance and Registrar of Friendly Societies for the year 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

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No. 10.. Report upon the Lunatic and Idiot Asylums of the Province for the year ending 30th September, 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 11.. Report upon the Common Gaols, Prisons and Reformatories of the Province for the year ending 30th September, 1896. Presented to the Legislature, 1st March, 1897. *Printed.*

No. 12.. Report upon the Houses of Refuge, Orphan and Magdalen Asylums of the Province for the year ending 30th September, 1896. Presented to the Legislature, 9th April, 1897. *Printed.*

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No. 13.. Report upon the Hospitals of the Province for the year ending 30th September, 1896. Presented to the Legislature, 30th March, 1897. *Printed.*

No. 14.. Report upon the Institution for the Education of the Blind, Brantford, for the year ending 30th September, 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 15.. Report upon the Institution for the Deaf and Dumb, Belleville, for the year ending 30th September, 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 16.. Report under the Children's Protection Act, Ontario, for the year 1896. Presented to the Legislature, 23rd February, 1897. *Printed.*

No. 17.. Report of the Agricultural College and Experimental Farm for the year 1896. Presented to the Legislature, 18th March, 1897. *Printed.*

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No. 18.. Report of the Entomological Society of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 19.. Report of the Fruit Growers' Association of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 20.. Report of the Bee-keepers' Association of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 21.. Report of the Poultry and Pet Stock Associations of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 22.. Report of the Dairymen and Creameries' Associations of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

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No. 23.. Report of the Superintendent of Farmer's Institutes of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 24.. Report of the Provincial Instructor in Road making in Ontario for the year 1896. Presented to the Legislature, 25th March, 1897. *Printed.*

No. 25.. Regulations governing payments out of the Iron Mining Fund. Presented to the Legislature, 17th February, 1897. *Printed.*

No. 26.. Report of the Live Stock Associations of the Province for the year 1896. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 27.. Report of the Fruit Experiment Stations of Ontario for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

No. 28.. Report of the Inspectors of Factories for the year 1896. Presented to the Legislature, 2nd April, 1897. *Printed.*

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No. 29.. Report of the Registrar-General relating to the registration of Births, Marriages and Deaths in the Province for the year 1895. Presented to the Legislature, 8th March, 1897. *Printed.*

No. 30.. Report of the Inspector of Legal Offices for the year 1896. Presented to the Legislature, 15th March, 1897. *Printed.*

No. 31.. Report of the Game and Fish Commission for the year 1896. Presented to the Legislature, 16th March, 1897. *Printed.*

No. 32.. Report of the Commissioners for Queen Victoria Niagara Falls Park for the year 1896. Presented to the Legislature, 9th March, 1897. *Printed.*

No. 33.. Report of the Bureau of Mines for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

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No. 34.. Report of the Provincial Board of Health for the year 1896. Presented to the Legislature, 2nd April, 1897. *Printed.*

No. 35.. Report of the Bureau of Industries for the year 1896. Presented to the Legislature, 7th April, 1897. *Printed.*

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No. 36.. Report of the Clerk of Forestry for the year 1896. Presented to the Legislature, 2nd April, 1897. *Printed.*

No. 37.. Return from the Records of the several Elections to the Legislative Assembly in the Electoral Districts of the South Riding of the County of Essex, the North Riding of the County of Oxford, the North Riding of the County of York, and the South Riding of the County of Essex, since the General Election of 1894, shewing: (1) the number of votes polled for each Candidate in each Electoral District. (2) The majority whereby each successful Candidate was returned. (3) The total number of votes polled in each District. (4) The total number of votes remaining unpolled. (5) The number of names on the Voters' List in each District. (6) The number of Ballot Papers sent out, and how disposed of in each Polling Sub-division. (7) The number of Tendered Ballots sent out. (8) The population of each District as shown by the last Census. Presented to the Legislature, 15th February, 1897. *Printed.*

No. 38.. Report on Capital and Income Accounts of the Toronto University for the year ending 30th June, 1896. Presented to the Legislature, 11th February, 1897. *Printed*

No. 39.. Report of the Standing Committee on Finance Toronto University, 1896-7. Presented to the Legislature, 11th February, 1897. *Printed.*

No. 40.. Report of the Commissioners on Toll Roads. Presented to the Legislature, 11th February, 1897. *Not printed.*

No. 41.. Copy of an Order in Council directing that certain money be paid to His Honour Judge Jamieson out of the surplus Surrogate fees for the year 1895. Presented to the Legislature, 11th February, 1897. *Not printed.*

No. 42.. Report on the distribution of the Statutes for the year 1896. Presented to the Legislature 11th February, 1897. *Not printed.*

No. 43.. Copy of an Order in Council directing that certain money be paid to His Honour Judge Mosgrove out of the surplus Surrogate fees for the year 1895. Presented to the Legislature 15th February, 1897. *Not printed.*

No. 44.. Return to an Order of the House, of the 18th day of March, 1896, for a Return shewing the amount the Government obtained for timber limits sold in the Township of Oakley. The amount obtained for timber dues on the timber cut in the said Township and the amount which has been expended by the Government on the roads and bridges of the Township, and all other expenditures by the Government in or for the Township. Also, the same information as to the entire District of Muskoka. Also, the number of patents issued in the Township of Oakley and the number of present locatees who have not received patents and the number of acres thereof still the property of the Crown. Presented to the Legislature 22nd February, 1897. Mr. *Langford. Not printed.*

No. 45.. Detailed Statement of all Bonds and Securities recorded in the Provincial Registrar's office since the last Return submitted to the Legislative Assembly, made in accordance with the provisions of the Statute, 32 Vic., cap. 29. Presented to the Legislature 26th February, 1897. *Not printed.*

No. 46.. Regulations respecting Public and High Schools in Ontario in 1896. Presented to the Legislature 26th February, 1897. *Printed.*

No. 47.. Copy of an Order in Council appointing certain persons Members of the Educational Council. Presented to the Legislature 26th February, 1897. *Not printed.*

No. 48.. Statement of the affairs of the Toronto General Trusts Company for the year 1896. Presented to the Legislature 26th February, 1897. *Not printed.*

No. 49.. Statement shewing Railways in the Province which have received Provincial aid up to 31st December, 1896. Presented to the Legislature 2nd March, 1897. *Printed.*

No. 50.. Copy of an Order in Council, approved by Colonel Sir Casimir Stanislaus Gzowski, K.C.M.G., Administrator of the Government of the Province, on the 19th day of February, 1897, relating to a license of occupation granted to Colonel Engledue of Byfleet, Surrey, England, and his associates, covering certain locations in the District of Rainy River. Presented to the Legislature 15th and 16th March, 1897. *Printed.*

No. 51.. Report of the Master of Titles for the year 1896. Presented to the Legislature 15th March, 1897. *Printed.*

No. 52.. Return to an Order of the House of the 26th day of February, 1897, for a Return giving a summarized statement of the amounts paid by the Government of Ontario in connection with the Dominion-Provincial Arbitration, and to whom, year by year. Presented to the Legislature 15th March, 1897. Mr. *Whitney. Not printed.*

No. 53.. Return to an Order of the House of the nineteenth day of February, 1896, for a Return, shewing the names of all persons, firms or companies indebted to the Province, since the date of the last Return made to this House, on account of timber dues, ground rent or bonuses for timber limits; the amount of indebtedness in each case: the balance, if any, due by such persons, firms or companies at the date of last Return, and the total amount of such indebtedness on the first day of January, 1896. Presented to the Legislature, 15th March, 1897. Mr. *Marter. Not printed.*

No. 54.. Analysis of Reports of Electoral District, Township Agricultural and Horticultural Societies. Presented to the Legislature, 15th March, 1897. *Not printed.*

No. 55.. Return to an Order of the House of the eighth day of March, 1897, for a Return shewing what was the amount of stock on hand in the Central Prison Industries on the 30th September in each of the years 1891, 1892, 1893, 1894, 1895 and 1896. Also, what was the amount of the outstanding account in connection with the Central Prison Industries on the 30th September in each of the above years. Shewing also, what was the amount of the net revenue from the Central Prison Industries on the 30th September in each of the above years. Presented to the Legislature, 15th March, 1897. Mr. *Marter*. *Not printed.*

No. 56.. Report on the House of Refuge for the County of Huron for the year 1896. Presented to the Legislature, 23rd March, 1897. *Not printed.*

No 57.. Report on the House of Refuge for the County of Waterloo for the year 1896. Presented to the Legislature, 23rd March, 1897. *Not printed.*

No. 58... Return to an Order of the House of the fifth day of March, 1897, for a Return of copies of the Minutes of meetings of the new Educational Council since its establishment, together with copies of all correspondence between the Minister of Education and the Council. Presented to the Legislature, 23rd March, 1897. Mr. *Whitney*. *Not printed.*

No. 59.. Return to an Order of the House of the tenth day of March, 1897, for a Return shewing the names, occupations and dates of appointment of the issuers of Marriage Licenses made during the years 1894, 1895 and 1896. Also, the number of Marriage Licenses issued in the years 1894, 1595 and 1896, and the amounts received by the Province from this source of income. Presented to the Legislature, 25th March, 1897. Mr. *Ryerson*. *Not printed.*

No. 60.. Return to an Order of the House of the twenty-fourth day of February, 1897, for a Return shewing the number of Pupils at each High School and Collegiate Institute, who passed, for the first time, the Primary Examination in July last. And shewing in the case of each High School and Collegiate Institute, the average length of time these candidates had attended, prior to so passing. Presented to the Legislature, 26th March, 1897. Mr. *Whitney*. *Printed.*

No. 61.. Report of the Inspector of Registry Offices for the year 1896. Presented to the Legislature, 30th March, 1897. *Printed.*

No. 62.. Copies of Orders in Council respecting the administration of the Game Laws. Presented to the Legislature, 30th March, 1897. *Not printed.*

No. 63.. Return to an Order of the House of the second day of April, 1896, for a Return of copies of all correspondence between the Government, or any member thereof, and any person respecting the opening of a certain letter addressed to F. R. Davidson, Burlington, by E.

Richardson, at the request of one Welsh, Emigrant Agent at the G. T. R. Station, Toronto, in the year 1895. Presented to the Legislature 30th March, 1897. Mr. *Kerns*. *Not printed.*

No. 64. Return to an Order of the House of the seventeenth day of March, 1897, for a Return giving copies of all correspondence between any member of the Government and any officer of the Northern Exhibition held at Walkerton, relating to the withholding of money payable to prize winners. Presented to the Legislature 30th March, 1897. Mr. *Carnegie* *Not printed.*

No. 65. Return to an Order of the House of the fifteenth day of March, 1897, for a Return of copies of any report of the Inspector of Division Courts, and all other documents in connection with the dismissal of John Dickinson, Bailiff. Also, giving the names of all applicants for the position, and copies of all correspondence regarding the same. Presented to the Legislature 31st March, 1897. Mr. *Ryerson*. *Not printed.*

No. 66. Return to an Order of the House of the fifteenth day of March, 1897, for a Return of all correspondence between the Government, or any member of the Government, or the Chief Game Warden, and any member of the Government of the Province of Quebec, with reference to the provision of the Game Laws of the two Provinces requiring residents of each Province to take out licenses in order to enjoy the privilege of shooting in the other Province. Presented to the Legislature 31st March, 1897. Mr. *Barr*. *Not printed.*

No. 67. Copy of an Order in Council respecting regulations made and established under the Algonquin National Park Act. Presented to the Legislature 2nd April, 1897. *Not printed.*

No. 68. Return to an order of the House of the thirty-first day of March, 1897, for a Return of copies of all correspondence between the Chief Game Warden and Alexander Dixon, touching the conduct of Deputy Game Warden Smith. Presented to the Legislature 5th April, 1897. Mr. *Ryerson*. *Not printed.*

No. 69. Papers *re* application of Estate of Alexander McArthur *re* Timber Berth, Township of Lumsden. Presented to the Legislature 7th April, 1897. *Printed.*

No. 70. Return to an Order of the House of the twenty-fourth of March, 1897, for a Return of the names of all persons or municipalities, who during the years 1890, 1891, 1892, 1893, 1894, 1895 and 1896, made application to the Government, under the Municipal Act, for an investigation into the financial condition of the municipality, and shewing how many were granted and how many refused, with the cause for refusal in each case. Presented to the Legislature 7th April, 1897. Mr. *Kerns*. *Not printed.*

No. 71. Return to an Order of the House of the eighth day of March, 1897, for a Return from the Clerks of the Police Courts at Toronto, Hamil-

ton, London, Kingston and Ottawa, shewing 1st. The number of times the Children's Court sat from the first day of January, 1896, to the first day of January, 1897. 2nd. The number of children brought before the Court. 3rd. The ages of such children. 4th. The ages of children sent to Penetanguishene Reformatory. 5th. The ages of children sent to Industrial Schools. 6th Nationality. 7th. Religion. 8th. The nature of the offences or reasons why brought before the Court. 9th. How disposed of. 10th. Number of children who were before the Court twice, and under four times. 11th. The number before the Court four times and upwards. 12th. The highest number of times any one child was before the Court. 13th. The number of parents summoned to answer for their children. 14th. The number who appeared. 15th. The Courts in which a separate calendar for juvenile offenders is kept. And shewing as well the number of children under thirteen received into the Penetanguishene Reformatory and Mercer Refuge during the last two years, and the special reasons for their receptions. Presented to the Legislature 8th April, 1897. Mr. *Howland.* *Not printed.*

No. 72.. Report of the Secretary and Registrar of the Province for the year 1896. Presented to the Legislature 9th April, 1897. *Printed.*

No. 73.. Return to an Order of the House of the twelfth day of March, 1897, for a Return of copies of all Orders-in-Council during the past year, referring to the sale of timber berths by tender rather than by public auction, and giving a statement showing the dates and the reasons for such sales: the number of square miles sold to each purchaser and the price at which the same were sold in each case. The names of each person so tendering for berths and the amount of each tender. Presented to the Legislature 10th April, 1897. Mr. *Whitney.* *Not printed.*

# TWENTY-SEVENTH ANNUAL REPORT

OF THE

# ENTOMOLOGICAL SOCIETY

OF

# ONTARIO

# 1896.

*(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)*

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO.

TORONTO:
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1897.

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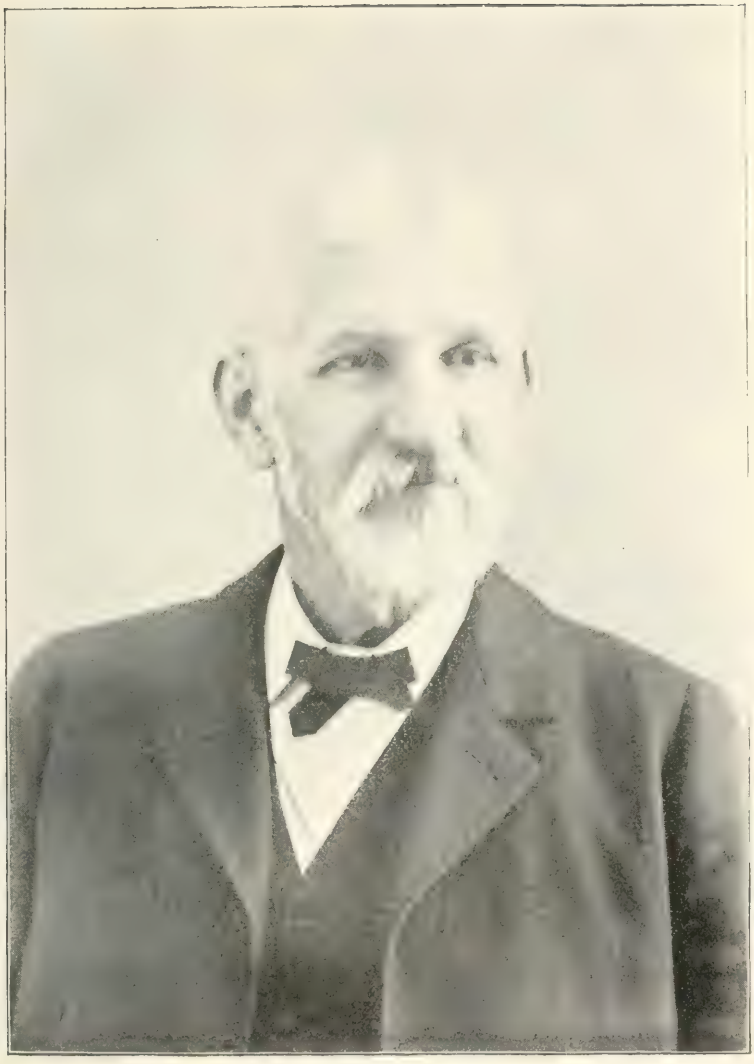
Rev. Thomas W. Fyles, F. L. S.

Member of the Council of the Entomological Society of Ontario, from 1882 to 1888; delegate to the Royal Society of Canada, in 1890, 1894 and 1895; member of the Editing Committee of the "Canadian Entomologist," since 1889.



J. M. Denton.

# TWENTY-SEVENTH ANNUAL REPORT

OF THE

# ENTOMOLOGICAL SOCIETY OF ONTARIO,

## 1896.

*To the Honorable John Dryden, Minister of Agriculture:*

SIR,—I have the honor to transmit to you the Twenty-Seventh Annual Report of the Entomological Society of Ontario. It contains a full account of the proceedings at our thirty-fourth annual meeting, which was held in the city of London, on the 21st and 22nd of October last, for the election of officers and the transaction of the general business of the Society. The report includes the addresses delivered and papers read at the meeting, together with the financial statement of the Treasurer and the reports of the various sections and departments of the Society. Considerable attention is given to the outbreak of the "Army Worm" in this Province, last summer, and the destructive work of the "Tussock Moth" to the shade trees in Toronto, and other papers are submitted dealing with matters of economic and scientific interest in connection with the study of Entomology.

*The Canadian Entomologist*, the monthly magazine issued by the Society, has now completed its twenty-eighth volume, which will be found to contain a large number of papers of a highly scientific character contributed by the most distinguished students of this branch of science in Canada and elsewhere.

I have the honor to be, Sir,

Your obedient servant,

CHARLES J. S. BETHUNE,
Editor.

# OFFICERS FOR 1897.

| | | |
|---|---|---|
| *President* | J. W. Dearness | London. |
| *Vice-President* | H. H. Lyman | Montreal. |
| *Secretary* | W. E. Saunders | London. |
| *Treasurer* | J. A. Balkwill | do |

*Directors:*

| | | |
|---|---|---|
| Division No. 1 | James Fletcher, LL.D. | Ottawa. |
| " 2 | Rev. C. J. S. Bethune, D.C.L | Port Hope. |
| " 3 | Arthur Gibson | Toronto. |
| " 4 | A. H. Kilman | Ridgeway. |
| " 5 | C. G. Anderson | London. |
| Ontario Agricultural College | Prof. J. H. Panton | Guelph. |

| | | |
|---|---|---|
| *Librarian and Curator* | J. A. Moffat | London. |
| *Auditors* | J. H. Bowman | do |
| | R. W. Rennie | do |
| *Editor of the "Canadian Entomologist"* | Rev. C. J. S. Bethune, F.R.S.C. | Port Hope. |
| *Editing Committee* | Dr. J. Fletcher, F.R.S.C. | Ottawa. |
| | H. H. Lyman | Montreal. |
| | Rev. T. W. Fyles | S. Quebec. |
| | James White | Shelgrove. |
| | W. H. Harrington, F.R.S.C. | Ottawa. |
| *Delegate to the Royal Society* | J. D. Evans | Trenton. |
| *Committee on Field Days* | Drs. Woolverton and Hotson, Messrs. Balkwill, Saunders, Anderson, Rennie, Bowman, Elliott and Spencer | London. |

# ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

## 1896.

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The thirty-fourth annual meeting of the Entomological Society of Ontario was held in its rooms, in Victoria Hall, London, on Wednesday and Thursday, October 21st and 22nd, 1896, the President, Mr. J. W. Dearness, of London, occupying the chair.

The meeting was called to order at 3 o'clock p.m., on Wednesday, when the following members were present: Rev. T. W. Fyles, South Quebec; Mr. H. H. Lyman, Montreal; Mr. J. D. Evans, Trenton; Rev. C. J. S. Bethune, Port Hope; Prof. J. H. Panton, Ontario Agricultural College, Guelph; Messrs. W. E. Saunders (Secretary), J. A. Balkwill (Treasurer), J. Alston Moffat (Curator), J. H. Bowman, H. P. Peck, B. Green, W. Scarrow, T. Green, W. J. Stevenson, J. S. Pearce, J. B. Spencer, J. Law, W. Lochhead, W. Percival, and Drs. Woolverton and Hutton, London, and Robert Elliott, Plover Mills. Letters of apology were read from Dr. James Fletcher and W. H. Harrington, Ottawa, regretting their inability to attend the meeting.

At the request of the President the report of the Council for the past year was read by Dr. Bethune.

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### REPORT OF THE COUNCIL.

The Council of the Entomological Society of Ontario beg to present the following report of their proceedings during the past year:

They have much pleasure in stating that the membership of the Society has been well maintained, and that there has been a gratifying increase in the members from Ontario and an especially large addition in the Montreal branch, from the Province of Quebec.

The twenty-sixth annual report on Economic and General Entomology was presented to the Minister of Agriculture for Ontario, in December last and was printed and distributed at the opening of the session of the Legislature. It contained one hundred and two pages, and was illustrated with thirty-four wood cuts and two full page portraits, one of the late Professor C. V. Riley, the most able and distinguished Entomologist in North America, who had been killed by a fall from his bicycle a few months previously, and the other of Mr. William H. Edwards, author of the "Butterflies of North America," the most valuable and important work of the kind ever published,—both of these gentlemen were honorary members of our Society. In addition to an account of the proceedings at the annual meeting, which included an interesting address on "The New Agriculture," by Mr. C. C. James, Deputy Minister of Agriculture, the volume contains the following valuable papers: "The value of Entomology," by Dr. James Fletcher; "How the Forest in Bedford was swept away," by Rev. T. W. Fyles; "Insect injuries of the year 1895," by Dr. Fletcher; "The growth of the wings of a Luna Moth," "Observations on the Season of 1895," and "Variation, with special reference to Insects," by J. A. Moffat; "Some winter insects from Swamp Moss," by W. H. Harrington; "Birds as protectors of Orchards," by Mr. E. H. Forbush; "The Rocky Mountain Locust and its allies in Canada," by Mr. S. H. Scudder. An abstract was also given of the proceedings of the seventh annual meeting of the Association of Economic Entomologists, together with some of the papers that were of special interest and value to the general reader.

*The Canadian Entomologist*, the monthly magazine published by the Society, completed its twenty-seventh volume in December last. The numbers of the twenty-eighth volume have been regularly issued at the beginning of each month during the current year; ten numbers, containing 270 pages, have thus far been published, containing a large number of papers of high scientific merit. The series of illustrated articles on the Coleoptera of Canada, by Mr. H. F. Wickham, has been continued and proves of great value to those studying this order of insects.

A fairly complete collection of the important insects of the country is now in the Society's cases. Some new and interesting species have been added during the year.

The most important addition to the library during the year is a complete set of the Annals of the Entomological Society of France. Nineteen other new volumes have been added and catalogued, besides the usual large number of scientific periodicals and exchanges.

The Council desires to express its satisfaction with the careful manner in which the Curator, Mr. J. Alston Moffat, continues to look after the collection of specimens, scientific instruments and library of the Society. Visitors have found him in constant attendance even outside of the hours at which he is expected to be present. Any one, whether allied with the Society or not, seriously studying any phase of insect life, has been cheerfully assisted by him. Farmers, horticulturists, and students bringing their specimens to the rooms in open hours, have thus the opportunity to have such compared with authentic specimens and identified.

The present accommodation which has served the Society since 1881 has become inadequate. Arrangements are being made to obtain new and more commodious quarters in the fine new structure in course of erection by the Young Men's Christian Association of this city.

The reports of the Secretaries of the several scientific Sections printed elsewhere show that, with the exception of the Ornithological one, they have held regular meetings at which useful and interesting lists of subjects were discussed.

The report of the Treasurer is highly satisfactory. The balance on hand, about $530, at the close of the financial year, August 31st, 1896, is larger than usual owing to the fact that some accounts had not then been presented for payment, but the current expenses for the remainder of the year will fully absorb this amount.

The Council desire to place upon record their grateful appreciation of the liberal grant from the Legislature of Ontario, which has enabled the Society to carry on during many years past its scientific and practical work in a manner which would otherwise have been impossible.

The Society was represented by Mr. J. D. Evans, of Trenton, at the annual meeting of the Royal Society of Canada, held in Ottawa, in May last. His report is also presented herewith.

It is with profound regret that the Council record the loss during the past year of two of their colleagues. Mr. John M. Denton, of London, one of the earliest members of the Society, died after an illness of some months on the 24th of March last. He was one of those who originally formed the London branch of the Society, and took a most active interest in it and the parent Society till the close of his life. For five and twenty years he was a member of our Council and did much to maintain the prosperity and usefulness of the Society. His sterling honesty, unfailing courtesy and genial hospitality won for him the respect and affection of all our members. We all deplore his loss as one personal to ourselves, and deeply sympathise wtih his widow in her bereavement.

On the 3rd of April Captain J. Gamble Geddes, of Toronto, died after a few days' illness, brought on by a severe cold. During several years he took an active part in the London branch and held the offices of Secretary-Treasurer, Vice-President and President in succession. After his removal from London he continued to take a great interest in the Society, contributing valuable papers to its publications and holding the position of

Director on the Council for many years. He was a diligent and enthusiastic collector in the order Lepidoptera and gathered together large stores of specimens, most of which are now in the museum of the Geological Survey at Ottawa. His untimely death is a source of deep grief to his colleagues and to a large circle of relatives and friends throughout the Dominion.

The Council desire further to tender their respectful sympathy to Miss Eleanor A. Ormerod, of Torrington House, St. Alban's, England, in her bereavement owing to the death of her sister and life-long colleague and companion, Miss Georgiana Elizabeth Ormerod, who died on the 19th of August last, after an illness of several months duration. The deceased lady was remarkable for her many talents and acquirements as a botanist, a conchologist, an artist, and a linguist, and for her great benevolence and generosity. She assisted her sister very greatly by illustrating her publications, helping in her correspondence and by her unfailing encouragement and wise counsels. She is widely known especially by the series of large coloured diagrams of injurious insects that she published under the auspices of the Royal Agricultural Society of England, and which are found to be of great practical use in illustrating lectures and addresses in this country as well as in Great Britain.

All of which is respectfully submitted.

J. W. Dearness,
President.

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Mr. W. E. Saunders presented and read the report of the Secretary.

## REPORT OF THE SECRETARY OF THE ENTOMOLOGICAL SOCIETY

### FOR THE YEAR 1895-6.

The year 1895-6 has been one of unusual activity to the local members of the council into whose hands the conduct of affairs at the Society's headquarters is placed, but the labors of the Secretary have been reduced to a minimum by the kind and efficient work done by the Librarian and Curator, who has attended to almost all of the work which might otherwise have fallen upon the Secretary. During the early part of the year the council issued a leaflet setting forth the advantage and usefulness of membership in the Society; the said leaflet being for the purpose of enclosure in the correspondence of the members and it is hoped that the influence of the Society will be widened thereby.

Seven council meetings have been called during the year, and three consultation meetings, to which all the local members were invited; for the conduct of business in general, and more especially for that relating to the change of rooms.

The negotiations which had begun at the time of the last annual meeting with the Young Men's Christian Association of this city, for the lease of a room in their new building, have continued throughout the year and have about reached a favorable conclusion, so that unless a hitch occurs, the Society should be occupying the proposed new room in three or four weeks.

The routine work of the Society has proceeded as usual, the meetings of the sections having been regular, except the Ornithological section which did not meet during the year. Particulars of the work of the other sections will be given in the reports by their Secretaries.

Some correspondence has taken place with those in charge of the meeting in Canada of the British Association in which the Secretary has been authorized to pledge the goodwill and hospitality of the Society to the visiting members, but the matter of representation at the meeting has been left for the general council to settle at the annual meeting.

All of which is respectfully submitted,

W. E. Saunders,
Secretary.

The Treasurer, Mr. J. A. Balkwill, read the following report of receipts and expenditure for the year ending August 31st, 1896 :

## REPORT OF THE TREASURER.

RECEIPTS, 1895-6.

| | |
|---|---|
| Balance on hand Sept 1st, 1895 | $ 241 91 |
| Members' fees | 324 54 |
| Sales of Entomologist | 82 59 |
| " pins, cork, etc | 127 18 |
| Government grant | 1,000 00 |
| Advertisements | 18 72 |
| Interest | 13 40 |
| | $1,908 34 |

EXPENDITURE, 1895-6.

| | |
|---|---|
| Printing | $ 571 43 |
| Report and meeting expenses | 149 42 |
| Library | 37 60 |
| Expense account, postage, etc | 78 90 |
| Rent and fuel | 103 05 |
| Insurance | 28 00 |
| Salaries | 360 00 |
| Pins, cork, etc | 99 01 |
| Balance on hand, August 31st, 1896 | 530 93 |
| | $1,908 34 |

We the Auditors of the Entomological Society of Ontario hereby certify that we have examined the books and vouchers of the Treasurer, and find them well kept and correct, and that the above is a true statement of the accounts of the Society.

JAS. H. BOWMAN,
W. T. MCCLEMENT, } Auditors.

Mr. Balkwill explained the several items of expenditure and stated that the balance on hand would all be absorbed in printing and other expenses before next year's subscriptions came in. The President in accepting the report, commented on the loss the Society had sustained through the removal of Mr. McClement, who has been appointed Lecturer in Chemistry in the Armour Institute at Chicago.

Mr. J. A. Moffat presented and read his report as follows :

## REPORT OF THE LIBRARIAN AND CURATOR

FOR THE YEAR ENDING 31ST OF AUGUST, 1896.

The number of volumes added to the Library during the year was nineteen of which nine were exchanges bound for the Society ; the others being received from various sources, already bound.

The most important of these were

The Missouri Botanical Garden.

The Year Book of the U. S. Department of Agriculture.

The Report of the N. Y. State Entomologist : Dr. Lintner.

The Report of the Gypsy Moth Commission.

The Proceedings of the Royal Society of Canada.

The Fifteenth Annual Report of the U. S. Geological Survey.

Acknowledgement is due to John Hamilton, M.D., Allegheny, Pa., for two volumes of his Coleoptera papers.

The whole number of volumes on the Library register is now 1,418.

A full set of the annals of the "Entomological Society of France," was obtained, in exchange for a full set of the publications of the Entomological Society of Ontario.

The number of volumes issued to local members was seventy-three.

But slight addition was made to the Society's native collection during the year ; most of the new material obtained being yet undetermined.

Respectfully submitted,

J. ALSTON MOFFAT,
Librarian and Curator.

Dr. Bethune moved, seconded by the Rev. T. W. Fyles, that the Annals of the Entomological Society of France, and such other volumes as may be decided upon by a committee to be appointed by the President, be bound.—*Carried.*

By instruction of the local members of the council, the Secretary brought up the question of cataloguing the books in the Society's Library by the London Free Library Board as an addendum to their reference list. After some consideration of the subject, it was moved by Mr. W. E. Saunders, seconded by Mr. J. D. Evans, that this Society views with favor the proposition of the Free Library Board to publish a list of the books belonging to the Society in their catalogue.—*Carried*

The Secretary called the attention of the meeting to the importance of having the Society represented at the meeting of the British Association, which is to be held in Toronto next year, It was thereupon moved by the Rev. T. W. Fyles, seconded by Mr. Evans, that the President and Editor be, and are hereby, appointed to represent the Entomological Society of Ontario at the meeting of the British Association for the Advancement of Science, to be held in Toronto in 1897, and that the President be authorized to appoint additional representatives at his discretion.—*Carried.*

Mr. J. D. Evans then read his report as delegate to the Royal Society at its meeting in Ottawa in May, 1896, as follows:

## REPORT FROM THE ENTOMOLOGICAL SOCIETY OF ONTARIO TO THE ROYAL SOCIETY OF CANADA.

As the representative of the Entomological Society of Ontario. I have the honor to submit a brief report of its proceedings and work during the past year.

It gives me much pleasure to be able to report that the membership continues to increase and is now much larger than ever heretofore, and that interest in its work is still unabated.

Valuable additions have been made to the Library and Collection of Insects—the number of volumes thus added being thirty-eight, making the total 1,399 volumes.

*The Canadian Entomologist*, the official organ of the Society, although not numbering quite so many pages as in the year previous, is yet largely increased beyond former years.

During the year 1895 it completed its twenty-seventh volume of three hundred and fifty-eight pages. There were forty six contributors, of whom twenty-nine were from the United States, three from England, and one from Germany—and of the remaining thirteen (Canadian) it is pleasing to be able to state that five of them were from the newer provinces west of Lake Superior. These contributed in the aggregate 100 articles in which were described 109 new species and seven new genera.

Among the more important papers published during the year may be mentioned the following:

The Coleoptera of Canada—Mr. H. F. Wickham, which ran through eight numbers.

Canadian Coccidæ—Mr. T. D. A. Cockerell.

Preliminary Studies in Siphonaptera—Mr. Carl F. Baker, which appeared in seven numbers.

Variation in Nemeophila Petrosa at Laggan in Western Alberta—Mr. Thos. E. Bean.

Synopsis of the Dipterous Genus Phora—Mr. D. W. Coquillett.

Mounting Insects without pressure—Mr. R. W. Rennie.

The Coleoptera collected at Massett, Queen Charlotte Island, B.C.—Rev. J. H. Keen.

Descriptions of the Larvæ of certain Tenthredinidæ—Mr. Harrison G. Dyar.

Notes upon the North American Saturnina, with List of the Species—A. Radcliffe Grote, A.M.

Butterflies of Southern Manitoba—Mr. E. F. Heath.

The Larvæ of the North American Saw-flies—Mr. Harrison G. Dyar.

The Life-history of Pamphilia Manitoba, Scud—Rev. Thos. W. Fyles.

To the aforementioned articles should be added also the numerous book notices of current publications of entomological literature, correspondence, obituary notices, etc,

In addition to the Monthly Magazine the Society publishes an Annual Report to the Department of Agriculture of the Province of Ontario, the twenty-sixth of which was issued in 1895, which consisted of 102 pages with numerous illustrations ; in this is given a very full report of the thirty-third annual meeting of the Society, which was held in their rooms in London, on Wednesday and Thursday, the 27th and 28th of November, 1895. An important feature of the annual meeting was an open meeting on the evening of Wednesday, in the City Hall, at which His Worship the Mayor presided and Prof. C. C. James, Deputy Minister of Agriculture of Ontario, delivered a very exhaustive and interesting address on "The New Agriculture," which was followed by Mr. James Fletcher with a very instructive address on "The Value of Entomology."

The annual report also contains the following papers :

How the forest in the District of Bedford was swept away—Rev. Thos. W. Fyles.

Insect Injuries of the year 1895—Mr. James Fletcher.

The growth of the wings of the Luna Moth—Mr. J. A. Moffat.

Observations on the season of 1895—by the same author.

Variation with special reference to Insects—also by the same author.

Some winter insects from swamp moss—Mr. W. Hague Harrington.

Birds as protectors of orchards—Prof. E. H. Forbush, Ornithologist of the Massachusetts Board of Agriculture.

The Rocky Mountain Locust and its allies in Canada—Mr. Samuel H. Scudder.

The reports of the Botanical, Geological and Microscopical Sections of the Society.

The report of the Montreal Branch.

The report from the Entomological Society of Ontario to the Royal Society of Canada.

And also a very full report of the proceedings of the seventh annual meeting of the Association of Economic Entomologists.

The Botanical Section reported that regular weekly meetings had been held during several months, at which the attendance was much in advance of previous years. Several papers had been read at the different meetings. One public field day was held at which much enthusiasm was manifested.

The Geological Section reported as having had a most prosperous year. The membership had increased, and average attendance at meetings was greater. A number of valuable papers have been contributed, and several very successful trips made to places of geological interest.

The Microscopical Section reported as having a number of very successful meetings at which a number of interesting subjects were presented.

The Montreal Branch presented their twenty-second annual report shewing a number of meetings held at which excellent papers were read, and the membership increased.

J. D. Evans,
Delegate.

## REPORT OF THE MONTREAL BRANCH.

Mr. H. H. Lyman read the following report :

The twenty-third annual meeting of the Montreal Branch was held in the library of the Natural History Society, on Tuesday evening, 19th May, at 8.15 o'clock.

Members present : Messrs. H. H. Lyman, President; A. F. Wynn, Vice-President ; G. Kearley, G. C. Dunlop, Dr. Wyatt Johnston, E. A. Norris, J. B. Williams, E. T. Chambers, T. D. Brainerd, H. Brainerd, G. H. Moore, and Lachlan Gibb, Secy.-Treas.

The President presented the following report of the Council :

### Report of Council.

In presenting their twenty-third annual report the Council have much pleasure in referring to the increased prosperity of the Branch, especially in regard to the large number of new members who have joined during the year.

Since our last annual meeting eleven new members have been added to our roll, but we have to deplore the loss by death of Mr. E. M. Gibb, who had only joined the Society during the previous year.

During the year eight meetings have been held, and the following papers and communications were read :—

The Life history of Pamphila Manitoba—Rev. T. W. Fyles.

Note on the occurrence of Æ lopus Titan—A. F. Wynn.

Notes on the season of 1895—H. H. Lyman.

Notes on the life history of Colias Interior—H. H. Lyman.

Description of the egg and young larva of Crurara Borealis—H. H. Lyman.

Notes on Trychosis Tunicula-rubra—Rev. T. W. Fyles.

Notes on the preparatory states of Erebia Epipsodea—H. H. Lyman.

The Importance of Entomological Studies to our Agricultural and Fruit Growing communities—Rev. T. W. Fyles.

Prairie and Mountain Plants—James Fletcher.

The larger Species of Argynnis and the Mystery of their Life History—H. H. Lyman.

During the season a course of short lectures to young people was inaugurated by the Natural History Society with the active assistance of our Branch. The lectures were delivered in the Society's lecture hall on Saturday afternoons, and it is hoped that they will have some beneficial effect in interesting some of the young people in natural history studies.

The Branch is under great obligations to the Natural History Society for the recognition extended to it as an affiliated society or section, such recognition carrying with it the valuable privilege of the free use of their rooms for our meetings when desired, while we retain unimpaired our connection with the parent Society in London.

The Council would recommend that all books belonging to the Branch should be inscribed with our name and placed in the Natural History Society's library on the understanding that we remain the owners of them, and that our members have free access to them.

The Treasurer's report shews that the finances of the Branch are in a healthy condition, and the Council would recommend to the new Council the advisability of considering how the surplus may be expended for the interest of the Branch.

Respectfully submitted on behalf of the Council.

H. H. Lyman,
President.

The Treasurer submitted his report, and it was moved by G. C. Dunlop, seconded by G Kearley, That the reports of the Council and the Secretary-Treasurer be received and adopted. Carried.

The following officers were elected for the ensuing year :

President—H. H. Lyman.

Vice-President—A. F. Winn.

Secretary-Treasurer—Lachlan Gibb.

Council—G. C. Dunlop, G. Kearley.

The President then delivered his annual address in which he dwelt upon the necessity of more of the members taking an active part in preparing papers and sustaining the interest of the meetings. He also drew attention to some of the problems in connection with the Lepidoptera which awaited solution, some of which the members ought to be able to get some light on during the season.

Mr. G. Kearley, in moving a vote of thanks, suggested that the list of problems should be printed and a copy sent to each member.

The meeting then adjourned.

Lachlan Gibb,
Secretary.

## ANNUAL ADDRESS OF THE PRESIDENT OF THE MONTREAL BRANCH.

Gentlemen,—In most societies it is usual for the President to deliver an annual address at the annual meeting and this custom can, I think, be adopted in our Branch without disadvantage.

From the reports of the Council and of the Secretary-Treasurer it can be seen that the Branch has had a reasonably successful season, in regard both to the number of papers read and to the large number of new members who have joined us.

There is one point, however, to which I would earnestly invite your attention and that is that the labour of providing papers for the meetings is left too much to the President and I feel that I do not receive the assistance in keeping up the interest of the meetings that any President has the right to expect from the members.

With the single exception of Mr. Winn's "Note on *Adelopos Titan*" read at the October meeting, all the papers were contributed by me or secured by me from outside friends like Mr. Fyles and Mr. Fletcher.

It seems to me that every member might do something to contribute to the interest of the meetings.

The simplest paper upon anyone's experience would at least do something to relieve the annual report of the monotonous repetition of my name as the contributor of papers.

Subjects of discussion might be suggested and genera or groups taken up and systematically studied, the members bringing together all their material in these genera and verifying determinations, studying up the generic characters and so learning why a particular species is placed in a particular genus.

I doubt if any of our members can tell in what a *Neonympha* differs from a *Satyrus* or an *Erebia*, or a *Phyciodes* from a *Melitaea*. Then more interest might be shown in bringing specimens to the meetings. Specimens do not need to be rare in order to be worth showing. Well-set specimens in fine condition of even the commonest species are always a pleasure to look at, and it would at least show that the members were actually collecting specimens.

Further, I hold that every true entomologist should be something more than a mere collector of specimens. We should all seek to do some original work, no matter how little, in the field that we study.

A great temple of knowledge of scientific truth is being built up by the workers in all departments of science, in all lands, and through all the centuries and we should all strive to bring at least one stone, well cut and true, to build into this great temple.

There are many interesting questions awaiting solution and some of us ought to be able to do something towards elucidating some of them. To mention a few among the butterflies, *Danais Archippus:* How early does this species appear here? Is it ever seen before the end of June? Is there a second brood? Scudder thinks not in the north.

*Argynnis Cybele.* For this species my paper read at the last meeting is a sufficient indication of points that require elucidating and I should be very grateful for any assistance, particularly for the donation of living females as early as obtainable.

*Argynnis Myrina.* Why is the emergence of this species spread over so long a time as described by Scudder? Are there three broods here?

*Melitæa Phaeton.* This species is attacked by a Pteromalid parasite which has not been determined and its life history is unknown, though there is some reason to believe that it passes two years before completing its cycle, is this the case? I greatly doubt it.

Of *Grapta Comma*, Scudder writes that "careful statements of its comparative abundance are needed from all parts of Canada, before its geographical distribution can be fully understood." It is attacked by an unknown Dipterous parasite which should be determined.

*Grapta Progne.* Does this species feed on elm as stated by Harris? How late in the spring do the hibernators fly? When does the summer brood appear, become abundant, and disappear?

*Eugonia J-Album.* So little is known of this species that notes of every kind are desirable. Is there more than one brood? Why are there more individuals late in August and September than earlier? How long does it continue on the wing?

*Vanessa Antiopa.* When does the first brood of the season appear here? When the second? Does it ever hibernate as a chrysalis?

*Limenitis Disippus.* How many broods are there in this locality?

*Satyrus Nephele.* Is it subject to attack by any parasite?

*Neonympha Canthus.* Has it any parasites?

*Neonympha Eurytris.* Is there a second brood or part of a brood here? If so how does it compare in numbers with the first? Are there any parasites?

*Pieris Oleracea.* How many broods are there? Why has it so generally disappeared before *Pieris Rapæ?*

This last question is one which might puzzle any scientific man even of the first rank. Still there must be some reason for it and any of us might stumble on it.

Is it possible that *Oleracea* was comparatively free from parasitic attacks before the advent of *Rapæ* which is preyed upon by many species and that some of the latter's enemies have turned their attention to the former?

Our meetings are now closing and field work should begin. Will not the members strive to have something of interest to tell or show when we again begin our meetings in the autumn.

The branches other than Lepidoptera and Coleoptera are sadly neglected. Can we not do something to work up our local forms of the Neuroptera, Orthoptera, Hymenoptera, Diptera, and Hemiptera?

H. H. Lyman.

The following paper was then read :

## NOTES ON THE SEASON OF 1896.

By the Rev Thomas W. Fyles, F. L S., South Quebec

For half of the year Quebec seems to be the very throne of the ice king. The winters are long, and, in them, the storms are frequent, and the frosts severe. This spring people were crossing the St. Lawrence on the ice till St. George's day (April 23rd). When the "bridge" broke up a school-girl and one or two other persons were taken from the floating masses in canoes. Frost and snow come upon us in the end of October. The season then for out door Entomological work is a brief one—little can be done before the first of May, and but little after the end of September.

The fancy of the English Entomologist in Canada, must often revert with regret to his experiences in the old country—to his early spring work at the sallows, and his late captures at ivy bloom—to his welcome of *Gonepteryx rhamni* in February, and his farewell to *Pœcilocampa populi* in December.

To those who make a practice of rearing insects there will, even in the winter months, be occurrences of interest. Thus, early in the year on examining some cocoons and chrysalids that I had in the house, I found that a fine specimen of *Tropus fulvipes*, Cresson, had made its exit from a pupa of *Papilio Turnus*, Linn.

From a jar of earth in which a batch of larvæ of *Deilephila chamænerii*, Harr. that had fed on *Epilobium coloratum*, Muhl, had buried themselves, I obtained—not the moths I expected, but—a number of two-winged flies of the species *Musicera anonyma*, Riley. The maggots of this species had destroyed the larvæ of the moth.

Our long winters afford us many opportunities for going over our summer captures, for identifying them and placing them in their proper order. And here I would record the capture at Sherbrooke, on the 25th of May, 1895, by the Rev. Abbe Begin, of that very rare and elegant butterfly *Thecla læta*, Edw. It was sent to me in February of this year for identification.

The following is a description of it :

THECLA LÆTA, *Edwards*, (Male).

*Colour above* :—Black with a purple blush. Near the hind margin of the secondaries are three ultramarine patches, with a black reniform spot near the outer edge of each.

*Colour beneath* :—Ash grey approaching to brown with a slight blush of purple on the primaries. Towards the hind margin of these there is an indistinct line, with a touch of light red near the upper part of it.

On the secondaries there is an irregular, but curved, row of light red spots, each with an *outer* edge of white. Near the outer angle there are three other such spots with the *inner* edge of white.

One of our earliest species is *Brephos infans*, Moesch. It is found in the birch woods around Montreal, while the snow is yet on the ground. I have not found the species in this neighbourhood though I have often searched for it.

It is a common saying at Quebec, "We have no spring." Summer seems to burst upon us all at once. This year on the 19th of April the swallows came ; on the 21st flocks of ground-birds appeared ; on the 26th the first hibernated butterfly shewed itself.

The first caterpillars to appear openly are the "Woolly Bears." Full grown specimens of *Phragmatobia rubricosa*, Harr. may be seen in April, shuffling over the snow. In colour they are soft seal brown slightly darker towards the head. The head is black and shining, and the feet are reddish brown. The specimens I have taken have not seemed inclined to feed, but have soon spun themselves up. Their cocoons have been light, and have had the larval hairs entangled in the meshes.

There is usually a space under the snowbanks, in the spring, caused by the warmth of the earth, and in this space vegetation commences. The creatures therefore may have fed up before they appeared upon the surface.

Among the immature larvæ that shew themselves in the early spring are those of *Euprepia caja*, Linn. On their first appearance at that season they are black, and about three fourths of an inch in length. They crawl out upon the side-walks, and upon the floors of out-buildings.

Some years ago I brought a batch of this species from the egg to perfection. They hibernated—if I remember rightly—after the second moult.

In the spring of 1891 I collected some larvæ of like appearance and habits, thinking I would raise a few more specimens of the moth. These larvæ moulted on the 4th of May, and shewed a broad side-line of red hairs, so I knew that I had been mistaken in supposing them to belong to *E. caja*. They again moulted on May 20th. On emergence from the old skins the heads and legs of the larvæ were honey-yellow, but they soon changed to jet black. On the 17th of June after having drawn, in every instance, a few leaves together for a tent, they went into chrysalis without spinning a cocoon. The chrysalid was blue-black with a bloom like that of an Orleans plum. The larval skin remained attached to the extremity of the chrysalis case. On July 10th the perfect insect appeared. It was *Arctia virgo*, Linn.

Speaking of larvæ, I would tell of the strange winter quarters of a caterpillar of a noctuid which I found early in the year. The year before I had obtained a specimen of that very rare hymenopterous parasite, *Sphecophagus prædator*, Zabriskie. From its position when I found it, I judged that it must have come either from a nest of *Vespa media*, Oliv., or from a mud castle of *Pelopeus cementarius*, Drury, both of which I was keeping in a window of my study. Hoping to obtain more specimens of Prædator, I collected in the winter all the wasps' nests I could. Snugly coiled up in a cell of one of these brought to me was the larva I am telling of. It became active in the warmth of my room, but I had nothing among my house-plants that it would feed upon, and it soon perished.

May the 1st was a bright, cold day. Frogs were croaking amid the broken ice and masses of snow in the pools, and large banks of snow lay in the woods. The poplars, birches and alders were in catkin, and the leaf-buds of the red elder (*Sambucus pubens*, Michx.), *near the ground*, were opening. On this day I saw on the sunny side of a stem a specimen of *Vanessa Antiopa*, Linn., bright in colour, and without a flaw.

After the 1st of May vegetation progressed by leaps and bounds, and insect appearances multiplied. By the 13th such delicate forms as *Lycæna marginata*, Edw., *Nemoria gratata*, Walker, *Rhenmaptera intermediata*, Gn., etc., were on the wing. On this date I saw a pair of *Osmia proxima*, Cresson, *in coitu* resting upon willow catkins. At the same time larvæ of *Pœciscu saligneana*, Clemens, which had remained through the winter enclosed in webs within their galls on Solidago, left their domiciles and buried themselves in the soil. The imagos appeared on the 30th of May.

On the 15th of May a specimen of *Feniseca Tarquinius*, Fab., appeared in my breeding-cage. As the chrysalid had been out of doors all the winter this marks the date of appearance of the early brood of the species.

*Lobophora angulineata*, Grt., was common on the bolls of spruce trees on the 19th, and on the 21st *Lobophora atroliturata*, Walker, appeared.

On the 20th a full grown larva feeding upon choke cherry (*Padus Virginiana*, L.) was brought to me. The next day it buried itself and went into chrysalis. The following is a description of it: Length an inch and three quarters. Head, rather small, brown. Body plump and smooth. Colour, light drab. Spiracles outlined with dark brown. Just above them is a dark brown narrow side-line. On each segment a transverse dark brown line runs backward to a sub-dorsal line of lighter brown. On each segment along the back and pointing backward is a light brown V-like mark, with a pale patch on each side of it.

The larva could not have attained its growth in the fortnight in which the choke-cherry had been in foliage—it must have hibernated.

The buried caterpillar made a cyst strengthened by a slight web. The chrysalis was very dark glossy brown, and had a terminal spine. The moth appeared on the 27th of June, and proved to be *Mamestra imbrifera*, Guen.

The beautiful larvæ of *Phyciodes Harrisii*, Scudder, were common on the white aster (*Diplopappus umbellatus*, Tor. and Gr.), on the 21st of May and till the end of the month.

On the 6th of June I went to "The Gomin." In the fact that I knew no place there in which to sit down lay the chief discomfort of my first visits to this swamp. Fortunately in one of my rambles I discovered a huge solitary boulder half imbedded in the spongy soil. Now I am sure of a resting-place whenever I can find leisure to visit the swamp. I can sit or recline at ease on this stone, which surely some benevolent genie, anticipating the needs of weary naturalists, deposited far away from its original matrix.

Seated upon this stone that 6th of June I looked round upon the scene. Before me, some hundreds of yards distant, was the one tall pine, my landmark and guide to exit from the swamp. Around extended the level reaches of sphagnum, forming a vast amphitheatre bounded with tamarac and spruce. The surface of this area was beautified with innumerable blossoms. The prevailing colour was rose, from the lovely blossoms of *Rhodora Canadensis*, L., and *Kalmia angustifolia* L., but this was relieved by the white tufts of cotton-grass, *Eriophorum polystachyum*, L., and the clustered blossoms of the *Ledum latifolium*, Ait. The pitcher-plant, *Sarracenia purpurea*, L., lifted here and there its tall stalks, each surmounted by a yet unopened bud and resembling the maul-stick of the painter, and here and there the handsome blossoms of *Cypripedium acaule*, Ait., appeared.

In this solitude, seated upon my chair of state, I could almost fancy myself the monarch of all I surveyed, but thoughts of the kind were dispelled when I saw a *habitant* approaching. I noticed a peculiarity in this man's gait—he lifted his knees like a high-stepping horse, as he made his way through the yielding sphagnum. The motion struck me as grotesque; but soon afterwards, on moving away, I found myself making progress through the swamp in the same absurd fashion. I suppose it to be the mode of progression natural to the case.

As the man passed there now and then arose, disturbed by his approach, a specimen of that handsome chestnut-coloured moth *Epicnaptus ophirmaria*, Hbn., or one of *Ematurga faxonia*, Minot, or one of *Chionobas Jutta*, Hübner.

Speaking of Jutta, I lately found among my papers a description of that butterfly written by a former member of this society, whose memory is dear to many of us—Mr. G. J. Bowles. I give it as a memento of our departed friend:

"*Chionobas Jutta*, Hübner. Lighter brown than Nephele, 3 eyelets in each fore-wing, centre one smallest, 4 or 5 on each hind wing, the one at anal angle largest. All the eyelets are small in size. Beneath, markings of fore-wings are repeated. Hind-wings marbled with brown and light grey, one eyelet near anal angle."

On June 10th, I took a pair of *Dolerus Aprilis*, Norton, among young spruce trees on Levis Heights.

On June 11th, a specimen of *Cerura cinerea*, Walker, burst from a cocoon that had been sent to me by a friend. This cocoon had been cut out from the boll of a poplar. It seemed to be formed of very fine woody particles cemented together into a case so hard that one might wonder how the insect could break from it. Examination showed that at the point of rupture the case was very thin. Besides *C. cinerea* I have taken, in Quebec province, *C. borealis*, Boisd., *C. scolopendrina*, Bdv., and *C. multiscripta*, Riley, the last named at Cowansville.

On the 15th June I saw several specimens of that handsome beetle *Rhopalopus sanguinicollis*, Horn, escaping from their tunnels in the stem of a red plum tree. They left oval openings large enough to allow of the insertion of a medium-sized goose-quill.

On the 24th of July I found full-grown larvæ of *Zirea Americana*, Cresson, feeding upon buck bean, *Menyanthes trifoliata*, L. I find this species every season in the same spot, and only in that spot. The larva has the habit of curling itself round with the head on the outside. The following is a description of it:—Head black and shining, a lighter shade just above the mandibles. Eyes protuberent, glossy black. The back of the larva is lead colour, inclining to blue. The second segment near the head and the anal segment are paler. Along the back are eleven cross-bars, formed of a central black spot with an oblong patch of yellow on either side, terminated on either side with another black spot. Between every pair of these bars are two cross lines of smaller black and *pale* yellow dots. Along the edge of the lead colour on either side is a row of eleven conspicuous black dots. Below it is a broad yellowish white spiracular line. The spiracles are small and black. Underneath them is a row of deep yellow warts each surmounted with two black dots. On the underside the larva is yellowish-white. The true legs are tipped with black.

I do not know the larvæ of *Abia Kennicotti*, Norton. There are two specimens of the fly in the Provancher collection. The differences between the imago of this species and that of *Z. Americana* are these: Kennicotti is smaller than Americana. Its colour is black with a tinge of green, while that of Americana is brown with a tinge of fuscous. Kennicotti has a distinct mark like a reversed Y, extending from the costa to the inner margin of the fore-wing. In Americana this wing mark is confused. The costal line and the venation of the fore-wings in Americana are heavier and more distinct than these of Kennicotti. The abdomen in Americana is somewhat spatulate; in Kennicotti it is rounded. The underside of the abdomen in Kennicotti is black; in Americana it is fuscous.

During the month of August pressing duties and frequent journeys hindered me from giving attention to entomological pursuits. This was unfortunate, for in one of my times of absence I lost a brood of young larvæ of *Hyptidus argentimaculatus*, Harris, which had come from eggs sent me by Mr. A. F. Wien. These eggs were round and black, and under the microscope resembled grapes. In the hatching they were ruptured irregularly. The young larvæ appeared in the last week of August. They were one-tenth of an inch long. The head was disproportionately large—suggestive of a boring habit. It was brown, and there was a brown shield on the second segment. The body was yellowish white, warty, and set with long hairs. The fore-legs were brown.

In September may be found in the leaves of the Golden Rod (*Solidago Canadensis*, *L.*) eye-like spots, yellow in the centre with a surrounding of reddish brown. Osten Sacken made a guess at the insect producing these, and named it *Cecydomyia euthenitera*, from the black substance, not unlike charcoal that is found in the galls. For several years I endeavored to raise the fly without success—I think for the reason that I did not collect the blistered leaves early enough. I am under the impression that the larvæ of the fly abandon the leaves, and undergo the pupal change in the herbage or the soil. The parasites of the species remain in the leaves. I raised two kinds of these in abundance, viz.: *Torymus Sackenii*, Ashmead and *Polygnotus solidaginis*, Ashmead. The first named, as seen under the microscope, is a marvel of gem beauty—a polished gem, glowing with crimson, green and gold. The latter is of more sober hue. It is admirably described by Mr. Ashmead in his monograph of the Proctotrypidæ, p. 397. The cocoons of the species may be found in the blisters, three or four in a cluster.

This year I think I have succeeded in raising the original cause of the gall. It is a *Sciara* closely allied to *S. ocellaris*, Coms. The following is a description of it: Expanse of wings, two-tenths of an inch; length of body, one-tenth; length of antennæ, one-twentieth. Hairy, of a uniform light brown; head rather small; eyes reniform; antennæ, 14 jointed; mouth organs large; thorax large, round; abdomen long, attenuated; wings rather dusky—a peculiar loop in the venation; halteres, club shaped.

While speaking of Hymenopterous parasites, I should like to express my admiration for the work among the Hymenoptera that is done at Washington by Mr. Howard and his *confreres*.

Mr. Howard's bulletin on the Joint-worm Flies, for its grasp of the subject, its clearness of description, and the beauty of its illustrations is a model work. Mr. Marlatt's NEMATINÆ is also first-class—excellent in every way. Of Mr. Ashmead's PROCTOTRYPIDÆ I can say, that the more I study it, the more I marvel at the amount of care and research that it betokens. It is a very mine of information.

I have said above that I wanted to obtain wasps' nests for a special purpose. Sometimes wasps' nests are plentiful enough. This season there has been a scarcity of them, from the nests of *Vespa maculata*, Fab. downwards.

Here is a story of a wasp's nest: Two Irishmen were working in the woods one day. One called to the other, "Pat, here's a bees' nest in a blather, let us take the honey!" "Ard sure," said Pat, telling the story afterwards, "there was more cry than honey; and the cry was from Terence."

A short time since I was at a village in the eastern townships; and a farmer I there called upon reminded me of a circumstance that occurred thirty years ago. At that time I was on a visit to a friend for whom this man was then gardener. He was troubled about a colony of wasps that had suspended their nest in the centre of the ceiling of the carriage-house. He was "afraid to burn it, and afraid to crush it." What could he do? "Meet me at night fall," I said "with a pair of steps and a lantern; and I will take it for you." At the time appointed I went, taking a cork, and a small bottle of chloroform in my pocket. I placed the steps under the nest, whilst the gardener held the lantern at a respectful distance. Having mounted the steps I deftly slipt the cork into the hole at the bottom of the nest, and then poured a teaspoonful of chloroform upon the top of the insect habitation. It immediately soaked through the paper covering; and then there was a great commotion within; but in a few moments all was still. I cut the nest from the ceiling with my pen-knife and brought it down in my hand. "Well," said the gardener, "that was neatly done!" And he has remembered all these years *the way to take a wasps' nest.*

On the 10th of this month I went to the St. Henri woods. *Colias Philodice*, Gdt. and *Chrysophanus Americana*, D' Urban, were on the wing. Besides them a few locusts and crickets, two noctuids out of reach, a two-winged fly (*Sericomyia militaris*, Walker), and a beetle (*Necrophorus tomentosus*, Web.) were all the perfect insects I saw.

I found larvæ of *Aulax nabali*, Brodie, in the stalks of the Wild Lettuce, *Nabalus altissimus*, Hooker, a foot, or so, from the ground. They were feeding in the white, downy lining of the stalk, and in some instances had commenced their cells or cocoons which as the stalk dries up will stand out in the hollow like bulblets, the size and shape of grains of hemp. Some years ago I exhibited cocoons of the species at one of our meetings. The perfect insects came from them early in the year following.

I have taken many a walk and examined many a tamarack in the hope of finding cocoons of *Platysamia Columbia*, Smith, a species that was taken at Quebec by Mr. Bowles. Some years ago I found a vacated cocoon of the species. I greatly fear that *Nematus Erichsonii* by stripping its food trees has banished this fine species from the locality.

## SOME INSECTIVOROUS MAMMALS.

By ROBERT ELLIOTT, PLOVER MILLS.

Under the above heading I would like to treat in a popular way of a group of animals which, on account of their food habits, have a more or less direct bearing on the science of economic entomology.

Three orders—namely, *Cheiroptera* (Bats), *Insectivora* (Moles and Shrews) and *Carnivora*, represented by such non-typical forms as the Raccoon and the Skunk—include all of our own species which deserve the apellation "insectivorous mammal."

Unfortunately the term "insectivorous" as applied to a bird or a mammal seems to imply that the food of the species in question is in some way necessarily confined to what we call injurious insects. As a matter of fact little or no discrimination between beneficial and injurious insects has been ascertained as being made by any of our mammals in the choice of their food.

A skunk, foraging through the damp and shady wood, will, on finding one, munch a golden Calosoma with the same avidity that it crushes a May beetle. Most of our terrestrial insects, good and bad as we classify them, are no doubt held to be invariably good by the hungry shrew lucky enough to capture them. From the bat point of view, the *raison d' être* of night flying insects is quite likely enough considered simply as an essential requirement in order to keep the old and exclusive bat family in its proper position at the head of all living things. Nevertheless much good may be done without conscious discrimination; the farmer may derive a benefit from an act performed by a creature not dreaming of his existence. If it can be shown that the despised bat, the misunderstood shrew and the persecuted mole, from an economic point of view, "do good by stealth and blush to find it fame," it may be accepted as sufficient justification for the appearance of this paper in the pages of an entomological report.

## The Bats.

The Bats, as an order, are very distinct from any other mammalian group. The most casual observer recognizes these uncanny-looking nocturnal swallows as simply *flying mammals*, and thus far no other mammals than bats have been found adapted for true flight.

Their relationship to other groups has never been clearly elucidated. No scientific explanation of their origin is afforded by the investigation of their fossil remains. In short any fossil hitherto discovered has been either all bat or no bat at all. While they are thus easily separated from all other groups, when we come to the consideration of how many species we have, the greatest difficulties are at once encountered.

In previous reports of this Society our able Curator, Mr. Moffat, has put with force the pertinent query, "What constitutes a species?"

That this question presses with peculiar force on any one attempting the classification of our bats is admitted by that eminent authority, Dr. Harrison Allen, from whose monograph—"The Bats of North America"—I quote, "The difficulties acknowledged in identifying the American species (*Vespertilio*) are apparently innumerable, so great is the range of variation in the proportions of the ears, thumbs, feet, tail and phalanges of the manus and in the coloration of the fur and the membranes. If the purposes of zoological science should end with the identification of species, the student might well be discouraged in his studies in this field. But, fortunately, the very intricacies of the subject suggest problems in the attempts to solve which his knowledge of the life and structure of these little organisms cannot fail to be increased."

Owing to the courtesy of W. E. Saunders, Esq., I have had the opportunity of making an extended study of a series of bats collected by him, chiefly in the vicinity of London. As I feel quite unable with the space at my disposal to give a non-technical description that would prove of practical value, I simply give a list of species with short notes on their distribution, etc.

All our species belong to the family *Vespertilionidæ*, are pre-eminently insectivorous and apparently hold the same relation to the night-flying insects that our swallows do to those insects which fly by day.

1. *Vespertilio gryphus* (Fr. Cuvier), The Little Brown Bat. Five specimens One of our commonest species, ranging in different forms from the north-eastern United States to Hudson Bay, and west to the Rocky Mountains. Pastoral in local distribution as contrasted with the more urban Brown Bat.

2 *Lasionycteris noctivagans* (Leconte). The Silvery Bat. Four specimens. Common throughout North America. Partial to waterways and known to be a good swimmer.

3. *Adelonycteris fuscus* (Palisot de Beauvois), The Brown Bat. Five specimens. Perhaps the commonest species in the more settled parts of the country. Of wide range.

Fig. 1 Shows a Red Bat hanging by hind feet. Natural size.

4. *Atalapha noveboracensis* (Ecxleben), The Red Bat. Five specimens, three adult and two young. Our most brilliantly coloured species. Habitat, North America at large, excepting the coldest regions.

5. *Atalapha cinerea* (Palisot de Beauvois), The Hoary Bat. Two specimens. Our largest bat. Habitat, Northern regions, occuring southward only at high altitudes. The capture of two specimens at London must be considered highly interesting to the student of zoo-geography.

Of the twenty-eight species treated by Dr. Allen as North American, the five given above seem to be all that have as yet been found in Ontario.

*Vesperugo carolinensis* (Geoff), The Carolina Bat. Ranging from Massachusetts and Pennsylvania southward, will possibly be found in Ontario.

Upwards of 400 species are known in the world. In the tropics large fruit-eating forms are abundant. Those of temperate regions, as ours, are almost exclusively insectivorous and as such must, generally speaking, be considered beneficial.

Fig. 2. Profile of head of same. Natural size.

Occasionally bats find shelter in badly constructed dwellings. There they congregate each morning in increasing numbers and finally, with much chattering and quarrelling they sink into their long hybernatory sleep.

In some cases the owner of the house, after different attempts to smoke them out with sulphur, is often driven to tearing off boards, and after considerable trouble and expense, gets rid of a colony of one hundred or more.

The most curious zoological fiction connected with bats is the absurd belief that they are the offspring of bed-bugs. Once a wise-acre of our country-side gravely advanced to me this untenable theory of the origin of bats. While admitting that owing to the similarity of their retreats bats might transfer the "bugs" to new quarters, I combatted as best I could the ridiculous statement by showing that it was a wholly unnecessary assumption. But lo! he, as if to demonstrate that "there are more things in heaven and earth than are dreamt of in our philosophy," challenged me to deny that *gorillas* had crossed over from Africa and had taken an effective part with Wellington in the Peninsular campaign against the French. In vain I defined the term "guerilla warfare"—he, forsooth, was a captain of our Canadian volunteers, and not wishing to have exemplified on myself his conception of a "gorilla attack," I escaped the dilemma with the diplomatic rejoinder that one story seemed as true as the other.

### The Moles and Shrews.

While we have here to treat of (scientifically speaking) a very different order from the bats, from an economic point of view their similarity is well shown by a quotation from Carl Vogt: "One may, indeed, say with truth that they continue on and under the earth, yes, and even in the water the persistent hunt for insects, snails and all possible vermin, begun by the bats in the air."

The insectivora is a large order of mostly small mammals, forming one of the primitive types of their class. Two families—Talpidæ (moles) and Soricidæ (shrews)—are well represented in the fauna of Ontario. While externally these animals simulate the appear-

ance of mice, they are in internal structure widely different. The rodent type of teeth as illustrated by the common meadow-mouse, or *vole* (Arvicola riparius), whose sharp, chisel-shaped incisors and flat-topped molars are admirably adapted to the gnawing and grinding of the farmer's grain and roots, is replaced in the moles and shrews by a totally different dentition. Here we have projecting incisors, mostly one pair, canines, pre-molars with pointed crowns and (usually) trifid molars—a machine well fitted for the capture of terrestrial insects, whose hard elytra are crushed with a facility truly surprising.

That the distinction between a *shrew* and a *mouse* is not more clearly known is a decided misfortune to both the farmer and the shrew. Meadow-mice feed on the farmer's crops and are generally treated as they truly are—that is, unmitigated pests. Shrews feed on insects and (in the case of one species, at least) on those very mice the farmer so cordially dislikes. Yet to the average farmer every little furry creature that runs through his fields is merely a mouse, nay even worse than that, if any distinction is made at all, it is usually against the poor little "screw mouse"—an unreasonable prejudice allied to superstition. I have seen a farmer really afraid of a tiny shrew as it darted hither and thither with amazing rapidity in its frantic efforts to escape. To one of such I told, with a touch of irony, a curious superstition held by the Eskimo of Norton Sound, as related by Mr. Nelson in his "Natural History of Alaska."

"Those Indians claim that there is a kind of water-shrew living on the ice at sea which is exactly like the common land shrew in appearance, but which is endowed with demoniac quickness and power to work harm. If one of them is disturbed by a person it darts at the intruder, and burrowing under the skin, works about inside at random and finally enters the heart and kills him. As a consequence of this belief the hunters are in mortal terror if they chance to meet a shrew on the ice at sea, and in one case that I know of a hunter stood immovable on the ice for several hours until a shrew he happened to meet disappeared from sight, whereupon he hurried home, and his friends all agreed that he had had a very narrow escape."

The moles are completely fossorial in their habits, and possess in a high degree the traditional pugnacity of all miners. One meeting by chance a rival above ground, fights with a fierceness that carried on in proportion by large animals would be really terrific.

The earth worm forms the staple food of moles, and as this worm is accounted an important factor in the formation and improvement of soils, the mole must, to that extent, be considered an injury to the agriculturist.

The disfigurement of lawns and gardens by the large quantities of soil thrown up by even a single mole in a night is a serious charge, more applicable, however, to the English mole than to any of ours. The still more serious indictment that our common mole eats the roots of vegetable and other garden plants is likely enough a slander. A mole in a garden burrows along a row of plants in order to procure the numerous grubs and insects which congregate in just such places. Later a *vole* (meadow-mouse), entering the tunnel, finds ready access to its favorite article of diet—the roots of garden vegetables. There is the mole's tunnel—there are the potatoes eaten—and so the mole is condemned.

The Ontario species are three in number.

1. *Condylura cristata* (Linn).—Star-nosed Mole.—A most unique species, owing its

Fig. 3. The Star-nosed Mole (reduced.)

name to about a score of radiating cartilaginous processes on the nose. Partial to moist situations, and so far as my own observations go, our commonest species. Fig. 3 (reduced).

2. *Scalops aquaticus* (Linn).—Shrew Mole.—The term *aquaticus* as applied to this species is a misnomer, as in its habits it shows a preference for the drier ground, coming frequently into gardens and being of doubtful utility there. Apparently rare in Ontario.

3 *Scapanus Americanus* (Bartram).—Hairy Tailed Mole, Brewer's Mole.—More northern than either of preceding. In habits resembles the shrew mole. One taken at Ottawa, as reported by Ottawa Field Naturalists' Club, 1890.

The shrews are much more terrestrial than the moles, and are still more mouse-like in their appearance. However, their long, pointed and movable muzzle should serve to distinguish them from mice. Their position in the economy of nature is, as has been pointed out, vastly different. They feed on insects the year round, and are nocturnal in their habits. They are all small, some exceedingly small, the Etruscan shrew, found in Italy, being the smallest of known mammals. Its head and body measure only an inch and a half in length, and its tail adds about an inch more.

What shrews lack in size they atone for in numbers, activity and voracity, and from an economic point of view they must be reckoned among the farmer's best friends. Two genera and several species occur in Ontario.

1.—*Blarina brevicauda* (Say.) Short tailed Shrew. More mole-like in appearance than any member of the next genus. Besides destroying innumerable injurious insects in the course of a year, this industrious mammal is a persistent enemy to mice, following them into their burrows and killing them there. Common in Ontario.

2.—*Sorex Cooperi*, Bachman.—Cooper's Shrew. This little dweller of our fields and woods is by no means so rare as its infrequent capture would lead one to suppose. While it moves in its agile, restless manner usually on the surface of the ground, it manages to travel under cover of dead leaves and herbage, thus eluding the notice of all but the keenest observer. Once in the woods about the middle of May, searching for salamanders, under rotten logs, etc., I captured alive a specimen of this diminutive shrew which I had disturbed and driven from his sylvan retreat. Placing it in a large bottle with a handful of cotton batting, I watched it dart through and through the cotton with astonishing rapidity. Half an hour later I introduced a live May beetle which was instantly attacked and entirely eaten. Within ten minutes I proffered an earth-worm which was immediately caught at the head and bitten down the middle throughout its whole length. The action although quickly performed left a groove or cut as neatly as any dissector could have done with a knife. The worm at once collapsed and from its whiteness I inferred that its blood had been extracted during the nipping process. As it remained untouched, within another ten minutes, wishing to know whether the shrew's appetite had been satisfied or whether it preferred insects to worms, I dropped in a second May beetle which was at once killed and the major portion eaten, the head and elytra alone remaining. Shortly afterwards the voracious little creature died, overcome as it seemed by the very abundance of supplies—a death suggesting, though somewhat dissimilar from, that of the farmer who, according to the Porter in "Macbeth," "hanged himself on the expectation of plenty."

Fig. 4. Sorex Araneus.—A Typical Shrew.

3.—*Sorex platyrhinus* (De Kay) Broad-nosed Shrew. In August, 1895, I captured in a field of reaped oats near Plover Mills, an individual of this species which as far as I know remains the only record for Ontario. In habits it differs in no marked degree from its congener, Cooper's Shrew. Fig. 4.—The common European Shrew (*Sorex araneus*)—a typical representative of the large and useful genus, Sorex. Natural size.

THE RACCOON (*Procyon lotor.*)

While the Raccoon is perhaps the most omnivorous of all our mammals, eating with avidity birds and their eggs, frogs, fish, cray-fish, nuts, fruits, corn and sometimes poultry, yet before framing an indictment against him we should give him fair credit for large numbers of insects and mice destroyed in the course of a season.

I have examined the stomachs of many 'coons killed during the time the corn was in the milky stage, and have nearly always found more insects than anything else, notably the red-legged locust, in seasons when that pest was most destructive.

THE SKUNK (*Mephitis mephitica*).

In the face of the unsavoury reputation with which common report invests the Skunk—a reputation partly acquired from an *occasional* raid on the poultry yard to kill chickens or to suck eggs, and partly by reason of his defensive and offensive odour, it is pleasant to quote from Dr. Merriam, the highest authority on North American mammals, the following testimonial as to his sterling qualities: "Of all our native mammals perhaps no one is so universally abused, and has so many unpleasant things said about it, as the innocent subject of the present biography, and yet no other species is half so valuable to the farmer. Pre-eminently an insect-eater, he destroys more beetles, grass-hoppers and the like than all our other mammals put together, and in addition to these devours vast numbers of mice."

In discussing this interesting paper, Mr. Fyles asked whether it were correct that a noticeable difference between a mouse and a shrew was that a cat would not eat a shrew, because it was carnivorous and therefore not suitable for food.

Mr. Saunders said that this was probably not because the shrew is carnivorous, but because it had a peculiar and unpleasant odour, derived from a sack or gland, and that this caused cats, hawks and owls to prefer other mammals. He then exhibited a series of skins of bats, and gave a brief account of each species.

Dr. Bethune, in commenting on the usefulness of skunks, mentioned the benefit they confer upon hop-growers by destroying the larva of a moth, *Gortyna immanis*, which is often very injurious to the plants. This caterpillar eats into the crown of the root and if unmolested gradually burrows through and causes the death of the whole plant. In the hop-yards in the northern part of the State of New York it is related that the owners encourage the presence of skunks and do not allow them to be molested. These animals prowl about the yard and by listening at the foot of a hop-plant discover whether there is a worm gnawing at the root; if so they speedily dig away the earth and extract and devour the worm. It only remains then for the grower to replace the earth and thank his unsavoury friend for the benefit that he has conferred in saving the life of the plant. This injurious insect the speaker had found very abundant some years ago in a large hop-yard at Erindale, near Springfield-on-the-Credit.

Mr. Fyles then exhibited a fine collection of insects recently taken in Barbados, West India Islands, by his son. After the inspection of these and other specimens that were brought by the members present, the meeting adjourned.

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## EVENING SESSION.

In the evening the Society held a public meeting in its rooms in Victoria Hall, at which there was a largely increased attendance of members, between thirty and forty being present. The chair was taken by the President, Mr. Dearness, at 8 o'clock. After explaining the much regretted absence of Dr. Fletcher, who was unavoidably prevented from attending, he proceeded to deliver the annual address, which he illustrated with specimens and drawings on the blackboard, and also with photographs, and which was listened to with great interest and attention.

## ANNUAL ADDRESS OF THE PRESIDENT.

By J. Dearness, London.

*Friends and Members of the Entomological Society of Ontario :*

I have the honor this evening to welcome you to the thirty-fourth annual meeting of the Society. By name, at least, I know of five other similar Societies on this continent : the American, the Cambridge, the Newark, the New York, and the Washington. The organization of only one of these, the first named, antedates that of our own Society.

The thirty-fourth annual meeting! To the younger members, who, but for a year or two have been witnesses of the work done in these rooms, and who have been reading the reports and the monthly issues of the *Canadian Entomologist*, it may be worth while to say that there is evidence that each and every one of these thirty-four years has been characterized by energy, progress and success, one almost equally with every other from the first until now.

The evidence is not far to seek, in fact we are overwhelmed with it. These shelves, stocked with reports and volumes, filling two sides of the room, tiers of drawers and cases of specimens, classified and catalogued, crowd us so that we scarcely have room for our chairs. Very material evidence this, even on the surface, that busy men founded this society and labored to promote its interests. In doing this great work two objects or purposes conspicuously inspired them—devotion to science for its own sake, and the desire to discover and disseminate knowledge for the sake of their fellow-men. No other incentive seems to have had any existence in their minds.

On the eve of removing from these rooms, where so much of the society's work has been done, to more commodious and convenient quarters, it seems opportune to turn our thoughts to the labors of the Society's veterans. We younger members cannot over-appreciate the rich heritage left us by these pioneers, and we should be stimulated by the contemplation of it to prepare ourselves to carry on the work in the spirit and enterprise of the example they have set us. The events of the year give emphasis to this statement. I presume only one person here can recollect attending an annual meeting before this one from which our beloved friend, the late Mr. Denton, was absent. His kindly voice, and that of another officer of this society, Capt. Gamble Geddes, of Toronto, have lately been hushed in death. The thought of their passing and leaving the work here which they had so much at heart suggests the desirability of the Society's compiling a memorial album, with portraits and sketch of its founders and its most earnest and useful workers.

A moment ago I said, "only one person here." I need not name him, as you all know it must mean the venerable editor of the *Entomologist*, Dr. Bethune, of Port Hope. Was he not at the inception of the society thirty-four years ago (in fact he and Dr. William Saunders, now director of the Dominion Experiment Stations, were its parents in every sense), and has he not attended nearly every annual meeting since its inception? May that one be many a year distant when he shall cease to be present; I can hardly conceive what one would be like without him and Dr. Fletcher and the Rev. Mr. Fyles. And although they all seem good for many years to come, yet you younger members must prepare to take their places sometime. I trust that even now you are observing, studying, reading—equipping to sustain and extend the good work so successfully begun.

Much has been accomplished, a very considerable library has been founded, much valuable material has been accumulated, a fairly complete taxonomy of the important insects of Canada and the neighboring States, has been placed on exhibition, and thus a foundation has been well laid that will enable future workers to specialize and to engage in practical studies with definite purpose.

## Some Injurious Insects.

It has been usual for the President, in his annual address, to present an economic entomological survey of the province. My field of observation has been limited to the six or seven townships around London.

Last year our Curator, Mr. Moffatt, reported the prevalence of the cut-worm moth, *Hadena Arctica* (Fig. 5) Householders in town and country remember the nightly dance of these moths around the lamps and their soiling of curtains and clothes during the day. This spring I noticed many a patch of spring grain that had been sown on plowed sod so badly eaten that the ground was plowed again and sown with peas or otherwise used. The farmers said the wire-worms are at work, but in any plot I examined it was no trouble to discover the greenish-yellow cut worm, the larvæ of the *Hadena*. Would rolling the affected part of the field at night with a heavy roller across the drills destroy enough of these larvæ to save the crop? I should like to hear the point discussed whether we may expect another invasion of our homes by this moth next year, such as Mr. Moffat described in the last report. I did not find any specimens that seemed to be parasitized.

The grasshopper or locust (*Melanoplus femur-rubrum*, De Geer, Fig. 6) was not nearly so injurious as in 1895. Its partial disappearance is probably mainly due to the increase of its parasite, the red mite, *Astoma* (Fig. 7).* The spring was favorable for the development of the grasshopper, and in some localities it was present in prodigious

Fig. 5.

*b*

Fig. 6.

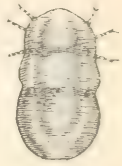

Fig. 7.

numbers. I never saw them more numerous or vigorous than on the 18th of June along a side road between Con. vii. and viii. of McGillivray. Two or three miles on either side of this locality but few were to be seen. Where they were numerous I did not find one parasitized specimen; where they were scarce but few had not the red mites adhering to them under the wings.

In a few limited areas of the country the army-worm, *Leucania unipuncta*, appeared in countless numbers and destroyed or greatly damaged oats, barley and corn. In early September the imagines were abundant everywhere in the range I travel. With the moths so numerous and generally distributed one would naturally expect the insect to be destructive next year. If such expectation is fortunately not realized, the interesting question arises—what influences have checked it? Is the multiplication of the Tachina fly so rapid as to prevent its appearance in destructive numbers the second year in the same district?

* Dr. James Fletcher, of Ottawa, writes that the prevailing opinion of arachnologists is that the *Astoma* (or *Atoma*) is the larval form of *Trombidium*, and that in Henshaw's Bibliography of Economic Entomology *Astoma gryllarium* is given as synonymous with *Trombidium locustarum*. Further references are Andrew Murray's "Aptera," pp. 128-129; Riley's "Rocky Mountain Locust," pp. 128-130; Lintner's Eighth Report, 1891, page 180; First Annual Report United States Entomological Commission, pp. 306-311. As a rule the six-legged mites are the larval forms.

The Fall web-worm, *Hyphantria textor*, has been very common in this county. I know two localities where every black ash—of which there was a considerable number of trees—was completely defoliated. Not a vestige of leaf was left. The trees were literally enwebbed from the top to the root. Seizing the webby fabric on the trunk it could be pulled off in strips reaching to the lower branches.

Fig. 8. *a*, worm; *b*, chrysalis; *c*, moth.

The orchard fruits in this country have been unusually free from insect injury. In 1895 fruit was a failure, owing to the heavy frost late in May. Its scarcity caused every apple that escaped to be gathered carefully. None was allowed to remain on the ground. This year all wormy fruit, and indeed much that is not wormy, is left to rot, so abundant is the crop and so insignificant the price for it. Hence the insects will develop without let or hindrance, save from their natural enemies. The abundance of this year's crop points to increased need for spraying next year.

### Failure of Pea Crop.

It would be out of place here to speak of fungal and bacterial injuries to crops, etc., to which I give more attention than to insects, but I may refer to the failure of the pea crop in Prince Edward County. Some farmers there find it profitable to raise garden pease for sale to the seedsmen. This year the crop failed; the diseased plants looked as though they were affected by a parasitic fungus. Mr. Craig, the Dominion Horticulturist, kindly sent me a large number of specimens. On many of them I found fungi, all probably saprophytic, not disease producing, but produced in the diseased or dying tissue, and, what is more noteworthy, on many, in fact nearly all the roots I examined, a minute Nematode or Anguillula-like worm. There were not any nodules such as the rose anguillula produces on the roots of that plant in the green-house. Much damage is done to plants in the Southern States by anguillulæ, but it has been thought that the winters in our latitude are too severe for any organism of this class to survive in injurious numbers. The failure of the pea crop in that county needs further investigation. I believe it was due to several causes, one of which was the presence of these nematodes.

### Parasitic Fungi.

Speaking of fungi naturally leads one to think of the work done in a new and im-important field, that of artificially controlling injurious insects by vegetable parasitism. Colonies of silk-worm and of the honey bee are occasionally devastated by a muscardine and pebrine and foul-brood respectively, which are fungal and bacterial parasites. It is not unreasonable to suppose that similar parasites may be discovered capable of artificial cultivation which may be introduced among gregarious insects as grasshoppers, army-worm, etc., and used to control them effectively. Prof. Forbes, of Illinois, has experimented extensively upon inoculations of the Chinch bug.

Laboratory experiments have been conducted in Cornell Agricultural Experiment Station by Mr. R. H. Pettit, under the direction of Professor Atkinson, with various parasitic fungi upon several different kinds of insects. Dr. Roland Thaxter has done splendid work on the *Entomophthoreæ*. Prof. Snow, of Kansas, Prof. Webster, of Ohio, and others, have also labored in the same field. So far, while many of the laboratory experiments have been successful and promising, the work in the field has not yet, to my knowledge, reached very satisfactory results.*

* Since writing the above I am informed by Dr. Bethune that at the Buffalo meeting of the Economic Entomologists, August, 1896, Prof. Webster, of Wooster, Ohio, stated that farmers in the districts of that State badly infested with the chinch-bug had eagerly obtained and used specimens of the pest artificially inoculated with *Sporotrichum* to distribute where chinch-bugs would come in contact with them, and thereby contract and spread the disease. He reported satisfactory and encouraging results.

The subject of entomogenous fungi is too large to enter on here, but it may be of interest to show specimens of a few of those most commonly met with.

The first is a parasite on the scale insect (*Lecanium* sp.), which I find on oak, ash, and blue beech. It is called *Cordyceps clavulata* (Schw); the genus is in the same order with the medicinal ergot or smut of rye. The fungus feeds upon the tissue of the insect, displacing the latter by its vegetative portion. It matures by producing erect sporophores, $\frac{1}{8}$ to $\frac{1}{4}$ inch long, bearing papillate conical heads. Under each papilla is embedded a perithecium containing numerous sacs or pods called asci, each of these sacs contains eight long, separate sporidia or "seeds."

Fig. 9.

Fig. 10.

Fig. 11.

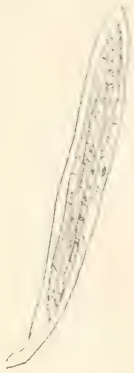

Fig. 12.

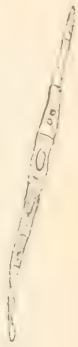

Fig. 13.

Fig. 9.—Twig with two scale insects. One of them killed by *Cordyceps clavulata*, having three sporophores of the fungus.

Fig. 10.—Head of one of the sporophores enlarged.

Fig. 11.—Cross-section of head of sporophore showing the flask-like perithecia greatly enlarged. These perithecia are filled with sacs as indicated at *a*.

Fig. 12.—A sac or ascus containing eight sporidia still more highly enlarged.

Fig. 13.—A sporidium or "seed" magnified 750 diameters.

The fly-fungus, *Empusa muscæ*, Cohn, belongs to a very different group of fungi. The former is placed in the class with black-knot of the plum tree and the mould on the gooseberry. This has close relationship to the white mildew of the grape, to the peronospora which produces soft rot of the potato, and to that causing a peculiar stinking decomposition of fish. No doubt you have observed dead flies surrounded by a whitish halo adhering to a pane of glass. This halo consists of the spores, conidia—and secondary spores thrown off by the growing fungus from the body of the infected fly.

When one of these living spores gets attached to the under side of a fly's abdomen, it puts out a tube which penetrates the skin and rapidly spreads through the whole body in the manner in which yeast grows through bread, feeding upon the fatty substances within the fly. The exhausted fly finally settles, it may be on a pane of glass, there the fungus by abjunction scatters its spores around the body producing that smoky halo to which I referred.

Dr. Roland Thaxter in his masterly monograph on the Entomophthoreæ in which he describes the various known species which affect flies, mosquitoes, gnats, aphides, cicadæ, thrips and lepidopteræ, says of the house fly fungus that its occurrence out of doors is an exceptional phenomenon, and that he knew of only two instances. His observation makes the specimens I have laid on the table the more interesting, as they were collected

off leaves and twigs near the edge of Cranberry Lake, in the County of Oxford. (A box containing twenty or thirty olive-colored flies killed by this fungus was passed round for examination.)

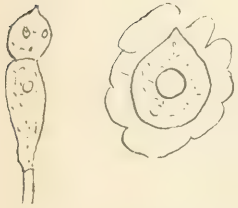

Fig. 14. Fig 15.

Fig. 17.

Fig 18.

Figs. 14 and 16.—Conidiophores forming white rings between the segments of the abdomen. Highly enlarged.

Figs. 15 and 17.—Primary and secondary conidia which form the smoky halo seen round the fly adhering to the pane of glass. Highly enlarged.

Fig. 18.—Conidiophores of *Isaria farinosa* slightly enlarged.

Another fungus, or stage of a fungus, doubtless quite common though not frequently observed, bears the name *Isaria*. These specimens which I have here grew upon pupæ, probably of Arctiids, and are labeled *Isaria farinosa*, Fr. They are supposed to be a stage of *Cordyceps*. Out of the insect grew these conspicuous sporophores, $\frac{1}{4}$ to $\frac{1}{2}$ inch long, orange at base but covered when fresh for two-thirds of their upper part by a white dusty layer of spores which arise from the ends of the threads forming the sporophore. At Cornell, spores from a potato culture of this fungus were painted on the ventral side of seven "woolly-bear" caterpillars; in twenty days the fungus had attacked all but two of them, and in another month one of them had developed showy sporophores like that from which the culture had been taken.

Fig. 19.

Fig. 20.

Fig. 19.—A thread of *Sporotrichum globuliferum* bearing spores greatly enlarged.

Fig. 20.—A thread of Isaria bearing spores separated from the compact sporophore. Greatly enlarged.

The fungus which has been used for infection experiments with the chinch-bug is known as *Sporotrichum globuliferum*. It was first found on Carabidæ and is somewhat like Isaria in its method of growth. Instead of the filaments being compacted into sporophores they envelop their hosts in a loose white cottony swathing. (An example of sporotrichum on a beetle was exhibited, also larvæ bearing *Isaria*).

### Entomological Literature.

The President's addresses have usually presented a brief review of the entomological literature of the year. That duty will be discharged this time by Dr. Bethune. I have just a word in reference to two publications that have recently come to these rooms—one a report of the Gypsy Moth Commission prepared by Drs. Forbush and Fernald,—a volume of over 600 interesting pages, devoted to one injurious insect. I refer to this to show what labor may be involved in studying and combatting even one insect. The labors of the Massachusetts entomologists in controlling the spread of the gypsy moth are a monument to the value of economic entomology.

The other publication to which I refer is a bulletin called "Practical Entomology" by Messrs. Hopkins and Rumsey of the West Virginia Agricultural Experiment Station. It is a veritable *multum in parvo* and although it contains only about 80 pages it keys and classifies the insects injurious to farm and garden crops in a very unique manner. The most inexpert farmer or gardener is led directly to a pretty certain identification of his insect foes and the approved remedies are briefly indicated. I wrote a letter to the authors complimenting them upon their plan of presenting practical entomology to the agriculturist. Director Myers acknowledged the letter and stated that it is their intention to continue this line of practical instruction to the horticultural and other interests and probably finally to publish the work in book form.

### Teaching Natural History in Schools.

On every occasion that has offered the opportunity, I have put in a plea for such modification of our school curriculum of studies as would provide for the education of the observing faculties of our children. Training to observe facts, and to relate causes and effects not only affords good mental discipline but is of the highest practical value. We must all to a greater or less extent be experimenters throughout our active lives; hence skill in observing, comparing, relating and judging is necessary to success. Properly conducted nature-study is therefore of very great value. For the purposes of such study local geography, and the phenomena of weather, plant and insect life, furnish the very best material.

The flower and the insect appeal powerfully to the child's interest and while in botany and entomology there are many problems that the greatest observers and thinkers have not answered, yet there are others that even the little kindergartners find a pleasure in solving when the proper method is pursued. At teachers' meetings and at the Central Farmers' Institute I have outlined a course of study pointing out what might be attempted, especially for the benefit of farmers' children in entomology, etc., in each grade. A few years ago Prof. Wm. Saunders read papers here entitled "Entomology for Beginners." He treated in a popular way the life history of the cabbage butterfly, the leopard moth, the polyphemus, the satellite sphinx, the red humped apple-tree caterpillar and the eyed elater.

We need such papers as those—modified so as to treat in an experimental manner the life history of a half-dozen common typical insects—containing practical suggestions on observing their habits, capturing, caging, feeding, and preserving them. The paper might be issued by this Society as a bulletin. The teacher would find additional assistance in such works as Prof. Panton's "*Insect Foes*" and Packard's *Entomology for Beginners*. Besides the educational value and pleasure to the children of such study consider what important practical bearing it would have. Such mistakes as I knew a gardener to make would not then occur. He killed the tomato sphinx larvæ by stamping on them, but those bearing the coccoons of its parasitic ichneumon he carried to the house to be immersed in boiling water to kill the eggs as he thought. Think of it, ignorantly scalding his best helpers!

Last spring I went to the proper committee of the Western Fair Board with the request that it offer prizes or diplomas to schools for exhibits of the life history of injurious insects. Our thanks are due to the committee for compliance with the request as it has shown what can be done by a teacher and his pupils in this line when he seriously addresses himself to the task. I have the exhibits here from school No. 14, N. Dorchester, and Union 5 and 15 London. The teacher in No. 14, Mr. J. W. Atkinson, had no technical knowledge of insects when he set about this work but taking advantage of the presence of the army worm in his section and following a few written suggestions on technique, he caged the larvæ, reared the moths, secured the eggs, and captured several beetles which prey upon the larvæ. What an object lesson this was to the children? How much more interesting, useful and exact their knowledge of metamorphosis having thus observed it, than if they had merely read the account of it in a book, even in a pretty picture-book. I think the result of this effort is well worth publishing. To that end I have had this photograph of the exhibit taken. See opposite page 32. It does not and cannot show the written sketch and the specimens of barley, oats, corn and mangolds damaged by the larvæ, but it will afford suggestions and stimulation to teachers who may see this report.

The exhibit of the squash-bug showing this injurious insect in seven stages from egg to adult males and female with a biographical sketch and specimens of its work on the pumpkin was prepared under the guidance of one of our young members, Mr. Robert Elliott of Plover Mills, in Un. 5 and 15. (The exhibits, written accounts and mounted specimens of the damaged crops, corn, oats, etc., were passed round.)

The report of the Council outlines the work of the Society for the year. The general verdict on its persual will be "Well done.". The only opinion meant to be adverse which I have ever yet heard upon the work of this Society is that too much attention has been paid to American insects and that our pages have shown too much intercourse with the entomologists of the United States. Congress gives to every State in the Union $15,000 annually to devote to experiment station work. To each of these stations are attached one or more practical entomologists. What a large staff of trained workers this liberal policy must tend to produce. Are we to be blind or indifferent to the wealth of investigation and result these men are accomplishing? The potato beetle, the horn fly, the army worm, have to be combatted—in short which of our injurious insects has not to be combatted by the farmers of the northern United States as energetically as by ourselves, indeed it is usually from and through that country they reach us for unfortunately these insects pay no attention to political boundaries nor customs' officers. I believe the Americans as well as the vast majority of our own people realize that entomologically theirs and ours is one country. The Americans have honored two of our members—Dr. Fletcher and Dr. Bethune by electing them in 1889 and 1893 respectively as president of the entomological section of their chief national science association, President Cook at the Indianapolis meeting in 1890, speaking of "our country" said, "by ours I include, of course, our Canadian brothers for we, as scientists know no line of separation." That sentiment is reciprocated here.

American entomologists cordially work with ours for the common good. I remember Prof. Saunders relating that Prof. Lintner, State Entomologist, Albany, N. Y., had enlisted his co-operation to control the gooseberry saw-fly, *Nematus ventricosus*, by sending him parasitized eggs of that species. This is but an instance that might be multiplied. At a meeting in Brooklyn, N. Y., Mr. L. O. Howard, Chief Entomologist at Washington, after highly complimenting the Rev. Dr. Bethune as a Canadian entomologist testified that—in a large measure due to Dr. Fletcher and to Dr Saunders—economic entomology had been energetically prosecuted in Canada. "Canada" he says "has the man (Dr. Fletcher) and the knowledge but has been hampered by want of funds. The result is that while she has immediately and intelligently adopted the results of researches made in this country she has not been able to lead us in original investigation."

It is foolish to think of entomological areas being demarked by parallels of latitude or even by rivers and lakes. President Saunders in his address in 1882, declared that although belonging to Ontario and sustained in our work mainly by the liberal aid granted us by the Ontario Government, our sphere of usefulness extends throughout the length and breadth of this great Dominion, and also across the lines into the United States. That declaration is true; we can and do help our cousins across the lines and we are helped in return. The close student of the intercourse knows that we get as much or more than we give.

May our entomologists ever keep a watchful eye on the methods and results of their American confreres and continue to be regarded by them as skilful and helpful co-workers, and worthy in the future as in the past to fill places of honor in their national conventions.

### Discussion on the Address.

In rising to move a vote of thanks to the President for his very able and interesting address, Dr. Bethune said that he had been very kind in referring in so complimentary a manner to the founders of the society. Many years ago, Dr. William Saunders and the speaker set to work to gather together all those in this Province who were interested in entomology. After a meeting had been called, much assistance was given by Messrs. Croft and Hincks, two professors in the University of Toronto, and Dr. Sangster, who was at the head of the Normal School. Thus a beginning was made, and each year was marked by the addition of more members, and by some good work done. One of the early members was our lamented friend, Mr. John Denton, who had passed away since our last annual meeting, and who was esteemed and respected by every one who knew him. We all missed his kindly presence and the genial hospitality with which he always welcomed the members from a distance. He took the deepest interest in the welfare of the society, and by his exertions and wise counsels did much for its permanent success. The speaker also referred to the loss the society had sustained by the death of Captain Gamble Geddes, who had been an active member for many years and one of the Council representing Toronto Division.

Dr Bethune then spoke of the great value of the President's researches into the life history of parasitic fungi and the practical advantages that may result from them, and referred to the excellent work that was being done in this respect by scientific men in the United States. He had learnt, with much surprise, that objections had been made to the annual reports of the society on the ground that so much attention and space was given to the proceedings of the American Association of Economic Entomologists. In the first place it should be remembered that this association was originated by Dr. Fletcher, of Ottawa, and was organized and held its first meeting in Toronto; it is therefore as much a Canadian as an American society. Furthermore we must all feel that science has no political, geographical, religious or sectional boundaries; it embraces the whole world, and on this continent we know that, while we can sometimes help our American cousins, we are largely indebted to them every year for valuable additions to our knowledge. We who study entomology are especially aware of this. Many noxious insects have come to us across the frontier, paying no respect to political boundaries or custom-house officers, and we have been prepared for their coming and taught how to receive them on their arrival by the experience and the labours of our friends "on the other side." But for this knowledge we should be in an unhappy plight, and while we were trying experiments and studying out the history of the insect, it would be sweeping unchecked over our fields or fruit trees. Surely it is most important that we should take the earliest opportunity possible of giving to our farmers and fruit-growers the experience that has been gained by the various state entomologists and experimental stations scattered over the continent, and afford them information which they would be unlikely otherwise to obtain.

Mr. Fyles, in seconding the vote of thanks, expressed the great delight with which he had listened to the President's address, especially to the part relating to fungi, which

opened a wide field of great interest, and he felt personally very grateful to the President for giving such a clear account of the growth of fungi and bringing before the meeting matters with which few of them were familiar.

After the vote of thanks had been put to the meeting and pronounced "carried," amid much applause, the President introduced Professor Panton, of the Ontario Agricultural College at Guelph, whose work and labours were, he said, well known to all who are interested in agriculture and entomology. Prof. Panton, who was very warmly received, said he had great pleasure in being present at this annual meeting of the Entomological Society of Ontario. He had done a good deal himself to disseminate the teachings of the society during the last fifteen years, and each year he had been much interested in reading the reports of its proceedings and researches, but till now he had always been prevented from being present at its meetings. He then proceeded to give the following address :

## ENTOMOLOGY FOR RURAL SCHOOLS.

By Professor J. Hoyes Panton.

It is a gratifying thing to observe, that within the past few years, there has been a growing desire, on the part of farmers, to know more of the teachings of science, as it bears upon agriculture. It has been the privilege of the writer to attend many Farmers' Institutes since their commencement. At first, any topic of a scientific nature excited but little interest. The great majority cared little to hear about a subject, which seemed entirely of a theoretical nature; and, far removed from the truly practical work of the farm. However, that condition has passed away, and the average farmer now feels, that a knowledge of the teachings of science lies at the very foundation of success in the pursuit of agriculture.

He has learned that science is simply systematized knowledge; that its principles are founded upon the facts which are discovered daily on the farm, or in the orchard. In reality, the farmer is one of the most scientific of men, and is surrounded by conditions especially fitted to develop observation, comparison, and method in work. The Farmers' Institutes have done a great work in awakening farmers to the necessity of a study of science, as it relates to their work. But we believe, a greater future is in store for the people of rural districts, when their children shall have become acquainted with the teachings of science, by giving some attention to its study, while, at the common school, in their neighbourhood. With a view to direct attention to how the study of economic entomology might be taught in country schools, this address is given before the Entomological Society of Ontario. The subject of entomology is one well fitted for study in rural schools; specimens are readily obtained for illustration, and, it is especially suited to interest young minds.

This can be accomplished without additional expense in purchasing books, and with little withdrawal of time from the time-table.

The writer would suggest a series of talks upon the subject the last hour on Friday afternoon, during a portion of the summer months, when insects are most numerous.

Especial attention should be directed to such insects as are beneficial, or injurious, invariably having the pupils collect specimens and contribute them so as to form a collection that would represent the economic entomology of the section.

The following might be taken as an outline of several talks, before specific forms of insects were discussed, and with a little study on the part of any teacher, would supply valuable information :

### I. *Definition of an Insect—Nature of the Mouth—Life History.*

An insect, fig. 21, may be described as having three well-marked divisions: head, thorax, and abdomen; one pair of antennæ (feelers), three pairs of legs, usually two

pairs of wings; respiration by means of tube-like structures (*tracheæ*), simple and compound eyes and jointed limbs. Most insects undergo metamorphosis—that is, pass through a series of well-marked changes in their development from the egg to the adult condition.

Among insects we find two typical mouths: the masticatory or biting, characteristic of beetles and the larvæ of many insects; and the suctorial or sucking, represented in butterflies and plant-lice. A knowledge of these facts becomes of importance in the application of insecticides. Insects with *masticatory* mouths can be readily poisoned by applying some poison, such as Paris green, to their food; but those possessing a *suctorial* mouth must be treated with a substance that kills by contact and not by being introduced into the digestive system. Such insecticides as *Kerosene Emulsion* and *Pyrethrum* powder are suitable for this mode of treatment. Thus, by knowing the nature of mouths, we are able to suggest what substance is likely to be effective in destroying insects.

Fig. 21.

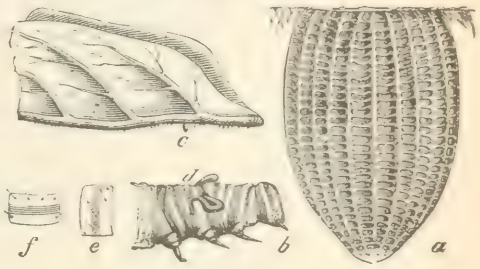


Fig. 22.

The development of an insect is represented by four stages—*egg*, *larva*, *pupa*, *imago*

The following figures illustrate the different stages of the Archippus butterfly, a red and black species which is familiar to every one. Fig. 22, *a* represents an egg, highly magnified, and *c* the egg of the natural size on the underside of a milkweed leaf; *b* shews the head and anterior segments of the caterpillar before its last moult, at *d* are the long fleshy horns, which at this stage are tucked under the skin; *e* and *f* shew the arrangement of the bristles on the segments.

Fig. 23.

Fig. 23 represents the caterpillar which is handsomely marked with black, yellow and white transverse stripes.

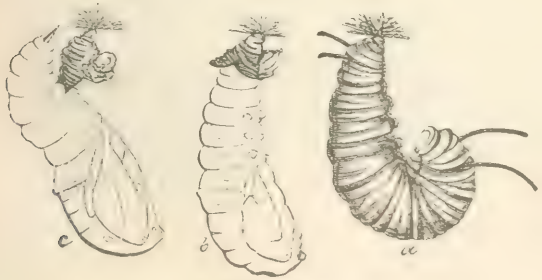


Fig. 24.

Fig. 25.

Fig. 24, shews the caterpillar at *a* suspended from a little button of silk preparatory to changing into a chrysalis; at *b* and *c* it is making further developments, till it becomes a lovely green pupa decorated with a band of golden spots, Fig. 25.

From this emerges in course of time the splendid butterfly, Fig. 26, which soars so gracefully through the summer air.

Fig. 26.

The *larva* (*larva*, a mask) is frequently without external organs and has a biting mouth; hence, it is a great feeder and usually very destructive to vegetation. The larval condition continues from two to six weeks in most; but there are some in which it is more than a year, *e.g.*, the wire worm, white grub, and some "borers."

*Pupa* (*pupa*, a doll). This is generally a resting condition, which, in summer, usually lasts but a short time (about two weeks); but if entered in autumn, continues till the next spring. The term *chrysalis* (*chrysos*, gold) is often applied to this stage in butterflies, because in some it is dotted with golden spots. In most moths a *cocoon* is woven around the pupa. Nymph is applied to the young of such as do not undergo complete metamorphosis in development; in such the young are much the same in appearance as the adult, but smaller, and usually wingless; *e.g.*, grasshoppers, bugs, etc.

*Imago* (*imago*, an image). This term is applied to the perfect insect, which is often harmless, as far as feeding upon vegetation is concerned.

The following names show some of the common terms applied to these stages in some orders of insects:

| | | |
|---|---|---|
| Larva | Pupa | Imago. |
| Borer, grub | " | Beetle. |
| Maggot | " | Fly. |
| Caterpillar or worm | Cocoon | Moth. |
| " " | Chrysalis | Butterfly. |
| Nymph | Nymph | Grasshopper. |

Fig. 27.

Fig. 28.

*II.—Insects may be Beneficial or Injurious.*

*Beneficial.*—The bee (honey); silkworm (silk); cochineal (dye); ichneumon (feeds on injurious insects).

*Injurious.*—Those affecting the products of the field (midges, Fig. 27, the wheat midge, etc.); the garden (cut-worms, Fig. 28, etc.); the orchard (borers, Fig. 29, etc.)

SCHOOL EXHIBIT OF THE LIFE-HISTORY OF THE ARMY WORM (see page 28).

A case illustrating the Life History of the Army Worm.

A case illustrating the Life History of the Tussock Moth.

*III.—Remedies.*

1. *Natural enemies.* *a. Birds.* Many investigations have been carried on to learn what insectivorous birds are useful in assisting man to keep in check his insect foes.

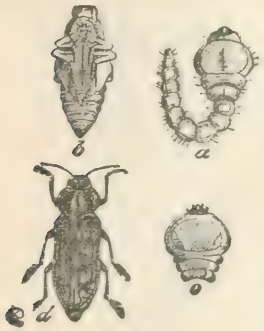

Fig. 29.

Thousands of birds have been shot, and the contents of their stomachs examined so as to ascertain with accuracy if the insects eaten were injurious. In some cases as many beneficial insects were devoured as harmful. The result of careful examination into the subject has been to consider the birds named in the following list as benefactors to the farmer, the fruit grower, and the gardener, and should, as far as possible, be protected and permitted to increase in number :—

King bird, pewee, night-hawk, swallow, whip poor-will, American redstart, yellow-billed cuckoo, blue bird, white-bellied nuthatch, red-headed woodpecker, high-holder, hairy woodpecker, downy woodpecker, golden warbler, red-eyed greenlet, yellow-throated greenlet, Wilson's thrush, brown thrush, cat bird, red-winged blackbird, crow blackbird, oriole, meadow lark, indigo bird, song sparrow, grass finch, chipping sparrow, chewink, purple finch, snow-bird, American goldfinch, horned lark, wren, chickadee, golden-crowned kinglet ruby-crowned kinglet, and American creeper.

(*b*) *Mammals.* Moles, bats, shrews, racoons and skunks. (See Mr. Elliott's paper on Insectivorous Mammals.)

(*c*) *Insects.* Among the most beneficial insects we find the following in the different orders :

Fig. 30.

Fig. 31.

Fig. 32.

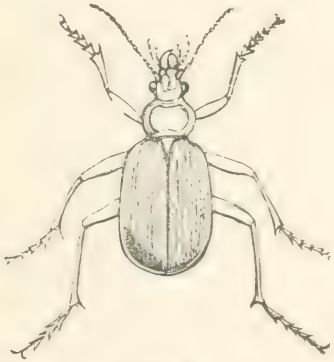
Fig. 33.

Fig. 34.

*Order Diptera.*—Syrphus fly (Figs. 30 and 31); Tachina fly.

*O. Coleoptera.*—Cicindela (tiger beetles) (Fig. 32); Calosoma (Fig. 33); Harpalus (Fig. 34) (ground beetles); Coccinella (lady-birds) (Figs. 35 and 36).

Fig. 35.

Fig. 36.

Fig. 37.

Fig. 38.

*O. Hemiptera.*—Reduvius, Arma (soldier bugs) (Fig. 37).

*O. Neuroptera.*—Chrysopa (laced-winged flies) (Fig. 38).

*O Hymenoptera.*—Vespa (wasps) (Fig. 39); Chrysis (cuckoo flies), Ichneumons, (Fig. 40).

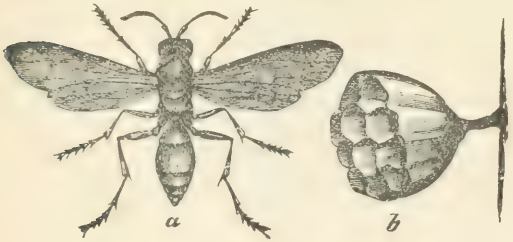


Fig. 39.

Fig. 40.

The above insects are of great importance in keeping the injurious insects upon which they prey in check. The ichneumons are most valuable in this respect. They are very numerous, and prey on many injurious insects, by depositing eggs in the larval forms. These eggs give rise to larval ichneumons that feed upon their host, which finally dies. About this time the ichneumons are developed and escape as perfect insects. The lady-birds are destroyers of plant lice; ground beetles prey on the potato beetle and several caterpillars, and the tiger beetles are great devourers of several species of insects.

(*d*) *Plants.* Some plants in the lowest orders do good service in destroying insects by being parasitic. Some (Empusa) attack the flies in autumn; some (Sporotrichum) the dreaded chinch bug, which is sometimes a serious pest in various parts of the United States; while the white grub has among its destroyers the parasitic fungus Cordyceps.

2. *Insecticides (substances used for killing insects), Gas, Paris Green and Kerosene Emulsion.*

*Poisonous gas*, generated in tents placed over shrubs and trees affected by scale insects, etc.

*Carbon Bisulphide.*—This colourless liquid is a most effectual remedy to get rid of insects in granaries, but great care requires to be taken as it is very inflammable and explosive, and may lead to serious results if any fire is brought near; even a cigar or pipe used where the vapor is being evolved may prove disastrous. It readily volatilizes; the vapor is heavier than air and is deadly to insect life. In using it the liquid may be placed in a small shallow vessel and put on the top of the grain, in bins or barrels. These are covered so as to keep in the vapor, which sinks down through the grain, destroying insect life wherever it comes in contact with it. After the operation is over the grain will lose all odor in a short time if exposed to the air. Some prefer taking a wad of cotton or tow, saturating it with the liquid, then plunging it into the middle of the bin and leaving it. Two or three bunches thus placed among the grain will soon kill all such pests as are found in it. One ounce is about sufficient for two bushels of grain.

*Paris Green.*—(Arsenite of copper, containing 50 60 per cent. of arsenic.) This is applied dry or in solution. In the dry form it should be mixed with 50 to 100 parts of plaster, wood ashes, flour or air-slacked lime and dusted upon the affected plants. The form in solution is usually one pound of Paris green to 200 gallons of water; but if the foilage is tender, 250 to 300 gallons of water may be used. This is the usual strength applied upon the plum and peach. As the green powder does not dissolve it requires to be kept thoroughly mixed by constant stirring. One pound of lime to every 100 gallons will prevent injury to the foliage. The Paris green should be first made into a thin paste, in a small quantity of water, and then added to the full amount of water.

*Kerosene Emulsion.*—This is a mixture of coal oil and water.

*Riley-Hubbard Emulsion.*—Consists of half-a-pound of hard soap in one gallon of water. Boil till dissolved, and then add two gallons of coal oil, and mix thoroughly for about five minutes. When properly mixed it will adhere to glass without oiliness. This can be done by forcing it through the nozzle of a force-pump repeatedly until the mixture appears complete. It will then form a creamy mass which thickens into a jelly-like substance on cooling. In using dilute with nine parts of soft water. This form is very commonly used and is easily prepared. If the foliage is very tender the emulsion must be more dilute, fifteen to twenty parts water.

Whale oil soap is better than the common hard soap, especially if the emulsion is to be kept for some time. Soft soap may be used instead of hard, using one quart. Where the water is very *hard* sour milk may be taken; in that case you require only to mix the coal oil (two gallons) and milk (one gallon) to get the emulsion, the soap not being required. This emulsion is liable to spoil if kept long. Kerosene emulsion is a most successful remedy for plant lice and scale insects.

### 3. *Barriers.*

Using barriers to check the progress of injurious forms, such as chinch bug, army worm, etc.

### 4. *Traps, Baits.*

Entrapping the insects, such as codling moth, canker worm and cut worms.

*(a)* Trap the larvæ crawling up and down the trunk by bands of rough cloth or tow, under which they will crawl and spin their cocoons.

*(b)* Use means to trap the climbing females. This may be done by putting a band of some material smeared with tar around the tree, or using what are known as "tree protectors," a sort of funnel-shaped structure that is fastened around the tree three or four feet from the ground; these prevent the females from getting up the tree.

*(c)* In gardens poisoned baits may be successfully used, such as small bunches of clover, cabbage leaves, etc., dipped in Paris green solution (one pound Paris green to one hundred gallons water), and placed near the attacked plants. The cut worms will feed upon these and be destroyed.

### 5. *Agricultural.*

1. A proper rotation, so as to avoid sowing crops in fields where they are likely to be destroyed by insects.

2. Using good seed, *e.g.*, peas without bugs.

3. Varying the seeding time so as to have the plants either too late or too early to be attacked by injurious insects.

4. Summer fallowing, so as to starve the insects and expose them to birds, etc.

5. Drainage. Some insects prefer moist soil, in such cases drainage will render it unfit for them.

6. Fall plowing is injurious to many insects especially the wire worm.

7. Manure. The use of manure helps the plants and enables them to overcome insect attacks. Vigorous plants are more likely to escape than sickly ones.

If such an outline were followed, a portion being taken for each talk, the leading principles of economic entomology would soon become familiar. Then, particular insects might be studied, and the pupils be encouraged to work out the life history of some. Starting with the egg, and observing the different stages passed until the perfect insect is reached.

Would it not be an excellent plan to influence the directors of county fairs to offer prizes for the best collections of beneficial and injurious insects, or for the best case illustrating the development of an insect from the egg to the imago?

If our teachers, in rural schools, were to follow a course something like what has been outlined in this address, who could estimate the influence upon the rising generation of farmers? Teachers desirous to take up this work could readily secure bulletins and books that would serve their purpose admirably. The writer would not have pupils get books, but to depend entirely upon the instructions of the teacher and their own observations in the orchard and upon the farm.

Such study of the great Book of Nature would result in developing observation in young minds, something that is aided very little in our system of education among rural schools. No faculty in the young mind is so ready for development as observation, and yet how little is done to assist it. Nature furnishes material on every side in the country, and surely we should take advantage of it and early train our young to be close observers.

We have no doubt that the study of such subjects would increase the attractiveness of farm life, and serve to keep many a boy upon the farm who, with such surroundings as we find to-day, seeks the shadowy allurements of a home among overcrowded centres in town and city.

We hope the day is not far distant when the teachings of na ure will be better known in country sections, and that the boys and girls of our farming districts will see more in farm life than what some bemoan as drudgery; that they will see in it that which tends to health, peace, independence, and an ideal home; and that while they eagerly learn *how* a thing should be done, they will also know the reason *why*, so that practice and science, the handmaids of agriculture, will be more closely associated than in the past.

In the discussion which followed the reading of the paper, Dr. Bethune said that as he had been a school-master for six and twenty years he could well appreciate all that had been said, both by the President and Professor Panton, on the subject of teaching entomology in schools, especially in those situated in rural districts. Any one who tried it would be pleased and surprised to find how readily people in general are interested in subjects of this kind, even when they have not paid any attention to them before. And in the case of children, who are always curious about anything that attracts their attention, it is an easy matter to excite their interest and lead them to observe for themselves some of the wonders and beauties of Nature. He thought that the plan of devoting the last hour on Friday afternoons in country schools to talks upon Natural History was an admirable one, and he hoped that it would be widely adopted. He had formerly made use of this hour in a similar manner himself, but of late years the large increase in the number of subjects for the Matriculation Examination had rendered it impossible to spare the time. He thought that if country life could be made more interesting to the young people fewer of them would be so eager to abandon their farms and rush into the towns and cities.

Mr. John S. Pearce spoke of the valuable work of the Society, which he did not think was as generally known as it should be. He thought that more should be done, especially by paragraphs in the newspapers, to draw the attention of the public to the great benefits which the Society has been for years conferring upon farmers, fruit-growers and gardeners throughout the Dominion.

Mr. John Law moved a vote of thanks to Professor Panton for his excellent address to which he had listened with great pleasure. This was seconded by Dr. Woolverton, and carried unanimously. In putting it to the meeting the President (Mr. Dearness) spoke on the importance of training the powers of observation of children by bringing subjects of nature before them. The object would then become the teacher, and the school-teacher the interpreter.

The Rev. T. W. Fyles then read the following paper :

## THE IMPORTANCE OF ENTOMOLOGICAL STUDIES TO AN AGRICULTURAL AND FRUIT-GROWING COMMUNITY.

Rev. Thomas W. Fyles, F.L.S., South Quebec.

It is wonderful proof of the wisdom and goodness of God that this earth, which He hath given to the children of men,* is so fitted and prepared that it affords scope and claim for the exercise of man's powers, and that man himself is so constituted that the employment of those powers is conducive to his well-being and enjoyment of life.

So true is this that though the fiat has gone forth—"Thorns and thistles shall the earth bring forth to thee. In the sweat of thy face shalt thou eat bread," it is also written. "Thou shalt eat the labour of thine hands. O well is thee, and happy shalt thou be."

In the vegetable kingdom materials in such great variety are so abundantly furnished, and man finds that he can, to so great an extent, select, transplant, modify and improve the plants producing them, for the supply of his necessities and gratification of his tastes, that he is stimulated to exertion, and comes to realize that he is, in a humble way, a co-worker with God ; and his work is ennobled to him by the thought.

And not only do men, whose very living depends upon their endeavours in the field, the garden, the orchard and the vine-yard. take an interest in rural occupations and their rewards ; "The king himself"—says the wise man—"is served by the field" ; and the devotes of Ceres, Flora and Pomona are to be found as well among the highly gifted and trained leaders of the public as among the hard-handed sons of toil. The most eminent statesman can take pleasure in a *primrose* or an *orchid* The great Lord Bacon spoke of Horticulture as the "purest of human pleasures ; and the "Judicious Hooker," one of England's most learned and thoughtful divines, desired no higher preferment than a country cure, in which he might see God's gifts spring from the bosom of the mother earth.

It is the general interest in the productions of the soil, and whatever affects those productions, that is the *raison d' être* of the scientific associations fostered by our Department of Agriculture.

The task I have set myself is to shew the importance of Entomological studies to those who take an interest in the cultivation of the soil.

Entomology has to deal with "the locust, the caterpillar, and the palmer-worm"—God's "great army." So vast is this army that—to use the words of Dr. Lintner, the State Entomologist of New York—"it has been truthfully said that insects have established a kind of universal empire over the earth and its inhabitants. Minute as many of them are, and insignificant in size to other than naturalists, yet in combination they have desolated countries and brought famine and pestilence in their train." (First Report, p. 2.) Happily the hordes are duly apportioned. Each natural division of territory has its share. And there is such a marvellous arrangement of checks and counter-checks operating upon them that, as a rule, every kind is held in proper subjection.

The intentional or accidental transportation of an injurious species beyond the sphere of the operations of its natural foes sometimes occasions disaster.

Of the injuries wrought by imported insects we have had instances never to be forgotten, in the ravages of the Hessian Fly (*Cecidomyia destructor*, Say), the Cabbage Butterfly (*Pieris rapæ*, Linn.), the Colorado Potato Beetle (*Doryphora decemlineata*, Say), the Larch Saw fly (*Nematus Erichsonii*, Hartig), the Gypsy Moth (*Ocneria dispar*, Linn.), and the Fluted Scale (*Iceryia Purchasi*, Maskell).

It must not, however, be supposed that all insects are injurious. Many species must be ranked among the cultivator's friends. Indeed, of the 23,000 named species of North American insects about 8,000 only can be regarded as pests.

* Ps. cxv, 16.

Some species are injurious in one stage of their existence and useful at another.

Our Hawk-Moths by dispersing pollen act beneficially for the fertilization of blossoms; but if unchecked increase were allowed them, their caterpillars would become terrible pests, and would destroy not only our fruit-trees but many of our shade and ornamental trees also. Their numbers are however kept down by various species of ichneumons belonging to the genera Ophion, Cryptus, Microgaster, Apanteles, etc. I have seen as many as 150 parasitic grubs issue from one larva of *Sphinx Kalmiæ*, A. & S. It can easily be conceived that foes so numerous and so deadly would soon exterminate the Sphinges altogether.*

This would be a pity for, as I have said, the moths of the family perform a useful part. They are moreover very beautiful, and

"A thing of beauty is a joy forever."—*Keats.*

But the checks are met by counter-checks. Of those 150 grubs that I have mentioned not more than two or three escaped the attacks of a secondary parasite, *Pteromalus tabacum*, Fitch. This last named insect is a brilliant little object that once seen can hardly be forgotten.

People are familiar with the idea of one grub feeding inside another grub; but it is not so generally known that there are insects that pass their early stages and attain perfection inside the eggs of other insects. Ashmead in his valuable work on the Proctotrypidæ, published in 1893 by the Smithsonian Institution, has given descriptions of forty-one such insects.

Then there are numerous kinds of ground-beetles, lady-birds, syrphus-flies, soldier-flies, dragon-flies, etc., predaceous on other sorts, and therefore beneficial to man.

The first point I make then is this:—*A knowledge of Entomology is important that men may rightly distinguish between their insect friends and their insect foes.*

In a paper which I had the honour to read before the Fruit Growers' Convention at Ottawa, I showed the important work done by Humble Bees in the cross fertilization of blossoms. These insects are so entirely beneficial that some of their kind have been—with a sort of grim propriety—transported to New Zealand to labour there for the public good.

But, at the very time that the Humble Bees are operating in the orchard for the fruit grower's benefit, there are a number of other insects at work that do a vast amount of harm, namely, the Bud-worms, Canker-worms, Leaf-rollers, etc. *The great remedy against all these hurtful insects is arsenical spraying.* But if this spraying be delayed till the blossoms are opened the nectaries will become clogged with the arsenite, and though the instinct of the bees may lead them to shun the poisoned blossoms, the good those insects would do will be left undone. *The first spraying should be given before the flower-buds are opened; the second after the fruit is fairly set.*

The Ontario Legislature passed a law in April, 1890, which says:

"Sec. 1. No person in spraying or sprinkling fruit trees during the period within which such trees are in full bloom shall use, or cause to be used, any mixture containing Paris green, or any other poisonous substance injurious to bees."

*Promptitude in dealing with in urious insects is always of the utmost importance.*

A patch of aphides neglected will spread, and spread, till it covers a tree—a little one becoming a thousand.

The apple tree Aphis (*Aphis mali*, Fab.) lays its eggs in the fall; and Mr. F. M. Webster suggests that apple trees should be sprayed in winter (see 24th Rep. of the Ent.

* Let us suppose that the whole number of grubs mentioned would produce perfect insects, and that half of these would be females; then let us see what the natural and unchecked increase of these would be at the end of five years. A little figuring will shew that it would amount to the enormous number of 4,746,093,750.

Soc. of Ont., p. 90) for the destruction of the eggs. We should have to take an unusually mild time for such a purpose in this country! I dare say, however, that a spraying early in November, or early in the spring would be beneficial. Kerosene emulsion, made by violently agitating a mixture of two gallons of kerosene and one gallon of hot soap solution is prescribed as the remedy for use. It should be diluted with nine gallons of water (Lintner's 5th Rep., p. 161).

Late in the fall, or on favourable days in winter, the fruit grower can do good work by examining his trees and removing the egg masses of various species of injurious insects. A trained eye can readily detect the eggs of *Clisiocampa Americana*, Harris, Fig. 41. *Orgyia nova*, Fitch, *O. leucostigma*, A. & S., and the cocoons of *Platysamia Cecropia*, Linn., *Telea Polyphemus*, Linn., *Callosamia Promethea*, Drury, Fig. 42. etc. But in removing such as these he should be careful not to destroy the clustered cocoons of microgasters, nor the downy masses of those of *Apanteles longicornis*, Prov.—a species that is parasitic in the Tent caterpillars—for these insects are among his most valuable friends.

Fig. 41.

The destruction of every hibernated Potato Beetle in the early spring is the destruction of an incipient host. The potato plants should be sprinkled with Paris green as soon as they appear above ground.

A friend of mine when the beetles first invaded the province, and before it was quite known how they should be dealt with, broke up a piece of land in the very centre of his extensive farm, and planted it with potatoes, hoping that its isolation would secure him a good crop. One early day he went to the enclosure to see if the potato plants were shewing themselves. They were not; but to his disgust there was, to use his own words, "a durned potato-bug sitting on the fence, and awaiting for them to appear." His action in regard to that individual was both prompt and effective!

Fig. 42.

Gooseberry and currant bushes should be gone over with white hellebore *as soon as the leaf-buds begin to open.*

The eggs of many of our hurtful species are laid in patches, as for instance those of *Datana ministra*, Drury, which produce the yellow-necked apple tree caterpillars, and those of *Œdemasia concinna*, A. & S., which produce the Red-humped apple tree caterpillars, Fig. 43. The young broods of these may be found in July, each brood feeding on the *under side* of a leaf. The plucking and destroying of a leaf and its burden is easily accomplished.

The Round-headed Borer of the apple tree (*Saperda candida*, Fab.), Fig. 44, is a

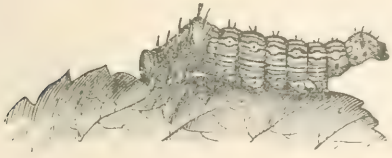

Fig. 43.

Fig. 44.

troublesome pest. Its native food-plants are the thorn, the moosemissa and the shad-bush, but it takes far too readily to the apple tree. The perfect beetle appears in June,

and lays its eggs in the end of that month and in July. In June then is the time for the fruit grower to go over the stems of his young apple trees with a brush and diluted soft soap. He can give them a scrubbing at the same time if he likes Sir Joseph Banks freed his apple trees from the American Blight (*Erisoma lanigera*, Hans,) by the use of the scrubbing brush alone (Kirby and Spence's Entomology, Letter VI.). The second point I make is:—THE STUDY OF ENTOMOLOGY IS NECESSARY THAT THE CULTIVATOR MAY KNOW HOW AND WHEN TO DEAL WITH HIS INSECT FOES.

The study of Entomology is profitable. What harm and loss have been averted by the making known of insecticides and how to use them! *But greater good is sometimes done by calling in the aid of friends than by direct attacks upon foes.*

The introduction of the Australian Lady-bird (*Vedalia cardinalis*, Mulsant) has probably saved the orange groves of California from extinction.

I have no doubt that if the parasite (*Diplosis grassator*, Fyles) which keeps down the numbers of the Phylloxera in this country had been carried over to Europe it would have saved many a vine-yard that has disappeared.

The late Professor Riley introduced from Europe the species *Microgaster glomeratus*, which is a check upon the cabbage worm (*Pieris rapæ*, Linn.). The insect is figured and described in Wood's "Insects at Home," pp. 325-7. Wood tells us that "so rapidly does it multiply that after watching its progress from the larva to maturity, it seems strange that a single cabbage white butterfly should be found in the country." * * * "If a hundred cabbage caterpillars be captured, there will be only one or two which do not contain the larvæ of the microgaster."

Mr. A. D. Hopkins, of the West Virginia Agricultural Experiment Station, has lately introduced the European predaceous beetle, *Clerus formicarius*, Linn, to the United States; and it is thought that this insect will check the destruction of the spruce forests which has proceeded to such an alarming extent in that country. The clerid larva is the natural foe of the bark-boring and wood-boring larvæ. It searches them out and devours them with avidity.

As *Clerus formicarius* is a new importation to this continent, and is at present little known, a short description of it may be acceptable. The beetle is about three-eighths of an inch in length. Its head and the fore part of its thorax are black. The after part of the thorax and the base of the wing-covers are brick red. The remaining portions of the wing-covers are black crossed by two somewhat wavy, snow white lines.

The name Kleros was given by Aristotle to certain larvæ found in bee-hives. The trivial name *formicarius* was given to this species by Linnæus because of the ant-like form of the beetle. (See Wood's "Insects at Home," p. 138).

A knowledge of Entomology was necessary for the understanding of the habits of these predaceous and parasitic insects, and for placing them where they might work to man's advantage. And this bringing about of good by the direction of natural agents is only in its inception. As our knowledge increases we shall, in all probability, be able to direct and control forces that are at present but little understood. My third point is:—THE STUDY OF ENTOMOLOGY IS NECESSARY THAT THE AGRICULTURIST AND FRUIT GROWER MAY MAKE THE MOST OF THEIR INSECT FRIENDS.

The Americans—a practical people—are fully alive to the importance of entomological research. Their division of entomology in the Department of Agriculture; their national museum; their experimental stations dotted all over the Union: their numerous scientific commissions, with their reports and bulletins—all bear witness to this fact.

Our own authorities do not mean to be behind hand. The establishment of experimental farms, the encouragement given to scientific and economic societies, farmers' clubs and institutes, etc., the printing and distributing of reports upon practical subjects, betoken an enlightened policy on their part.

But notwithstanding all that has been accomplished, sufficient care has not, I think, been taken to reach the young.

In 1887, in a paper read before the Teachers' Convention at Sherbrooke, I advocated the cultivation in schools of a taste for natural history. The means I recommended to teachers were :

I. Conversations on natural objects ; informal lessons ; extempore sermons on texts from the book of nature.

II. The formation of school museums, libraries and gardens.

III. The giving of formal object lessons, each complete in itself, and bearing upon the purpose in view.

Examples of peripatetic lessons on natural history may be found in Gosse's "Canadian Naturalist" (which is now, I am sorry to say, out of print) and in "Country Walks of a Naturalist with his Children," Groombridge & Sons, London.

Hints for the formation of school museums may be found in a work written by a brother of a former rector of Quebec, and published by the S. P. C. K, viz.,— "The Story of our Museum," by the Rev. Henry Houseman, A.K.C.

We need some one to do for Canada what Miss Ormerod is doing for England to popularize PRACTICAL ENTOMOLOGY.

We need a hand-book on this subject, written after the model of that useful work "Spotton's High School Botany," for use in our public schools.

We need school wall-sheets, representing the most important of our insect friends and insect foes in their different stages, and giving a few brief particulars concerning them.

But it is time I brought this paper to a close. I will only say in conclusion that I know of no study more fascinating than that of entomology. It deals with objects of such exceeding beauty ; the life histories it makes known are so marvellous that they tell like fairy tales ; and, above all, the revelations that it makes to us of the Divine power, wisdom and goodness so lift our thoughts from earth to heaven that we are ready to exclaim with the Psalmist, "Oh Lord, how manifold are Thy works, in wisdom hast Thou made them all ; the earth is full of Thy riches." Ps. civ. 24.

Mr. Wm. Lochead spoke very highly of Mr. Fyles's papers in the annual reports, which he always read with great interest and pleasure. He thought that the popularizing of the study of entomology in our schools would form another step in the progress and advancement of Canada. He then gave an account of the work that was carried on at Cornell University in connection with entomology and described the advantages to be gained from the lectures, and the practical work in the "Insectary," from such able teachers as Professor Comstock and Mr. Slingerland.

Mr. J. Law moved a vote of thanks to Mr. Fyles for his valuable paper, and was seconded by Mr. W. Scarrow, who spoke of the lack of mental interest in farmers, which might, he thought, be developed by education in entomology and the study of other natural objects, and in this way farm-work would become a pleasure instead of mere drudgery.

A very humorous paper was then read by Mr. Law, in which he gave amusing descriptions of the experience he had with ants and other insect pests during a residence in Cuba ; he related an attack which he witnessed of a large spider on a humming-bird, and spoke of the size and beauty of the fire-flies and the profusion and variety of insect life in the tropics.

The meeting adjourned at 10.30 p.m.

THURSDAY, October 22nd.

MORNING SESSION.

The society met at 9.30 o'clock, the President occupying the chair, and proceeded with the reception of the reports of the several sections of the society and other matters of a business character.

The following report of the Geological Section was read by its secretary, Mr. John Law :—

REPORT OF THE GEOLOGICAL SECTION OF THE ENTOMOLOGICAL SOCIETY FOR THE YEAR 1895-6.

The members of this section beg to submit the following report for the past year :

Regular meetings were held weekly during the year, with a fair attendance. There has been no great increase of membership, but we look forward to our future place of meeting in the new building of the Y. M. C. A. as a means of stirring up our members to increased action in matters relating to the mineral wealth of our country and the welfare of the local section.

Additions have been made from time to time to our individual collections obtained from trips to outside places during the season. Our hopes for forming a central collection have not yet materialized owing to the failure of the effort to obtain the only rooms suitable for that purpose in the new public library building. This Section is pleased to state, however, that a collection of minerals has been presented to the free library, through the influence of Sir John Carling, by the Dominion Government. It is now accessible to our members, having been recently arranged and classified by the chairman of the section ; this is putting into effect what was suggested in our last year's report, viz., "That it would be a great advantage to students of mineralogy if some steps could be taken by which the small number of geological and natural history societies in the Province could be provided with suitable collections of accurately named specimens of the chief economic minerals of the Dominion." A collection of minerals at the Western University is also available.

A number of places of geological interest have been visited by one or more of our members during the past season. A stroll through the Niagara district from Grimbsy to Hamilton afforded a collection of fossils from the prevailing rocks in that vicinity, viz., Niagara, Clinton, Medina, the upper Silurian formation. Other places visited were Owen Sound, Kettle and Stony Points (Lake Huron), Forest, St. Thomas, Sault Ste. Marie, Petosky, St. Ignace and Mackinac Island (Michigan), and Bruce Mines on the north channel.

Collections were made from each of these locations, affording the section plenty of new material for the coming winter's work. Valuable papers have been read from time to time before the section on natural history, astronomy and physiology. Some four to five lectures were also given on psychological subjects by the Rev. Mr. Falling.

A number of second year students of the Western University are also taking up the study of geology and mineralogy with the section.

Signed on behalf of the Geological Section by

S. WOOLVERTON, Chairman.

JOHN LAW, Secretary.

REPORT OF THE BOTANICAL SECTION OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

In presenting their annual report the Botanical Section have pleasure in stating that the work of the year has been on the whole satisfactory and encouraging.

The meetings have been well attended, interesting and profitable, the new members especially showing an unusual interest in the work.

Meetings were held regularly every Saturday from the 1st May till the middle of July, after that the absence of many members on holiday trips and other uncontrollable circumstances interfered much with our meetings.

The work of the section was arranged so that the more advanced was taken one Saturday, and instruction classes in the more elementary work the next Saturday, the senior members taking turns in directing the examination of types of the common orders collected by the members.

The outings this year were mainly to localities near the city—one exception being a very pleasant trip to Woodstock and neighborhood, where the section were very hospitably entertained by Mr. Thos. P. Hart of that district.

Rare specimens obtained were *Orchis rotundifolia* and *Ophioglossum vulgatum*.

It is believed that the removal to more commodious rooms in the new Y. M. C. A. building will place the section as well as the society and their objects more prominently before the citizens, and result in a greatly increased membership, and consequently usefulness of both.

The section, while congratulating its ex-secretary, Mr. W. T. McClement, M.A., on his appointment to an important position in the Armour Institute, Chicago, regrets his removal from London. When he left he had tabulated the flora of London and environs as far as the Compositæ. This important work will be carried on by the section during the coming season.

A. HOTSON, M.D., Secretary.

## REPORT OF THE MICROSCOPICAL SECTION OF THE ENTOMOLOGICAL SOCIETY.

Under the leadership of Mr. Rennie, the Microscopical section has had a year of continued success. The interest of members has kept them diligent in the good work. Notwithatanding the drawbacks consequent upon the poor position of our meeting place, the attendance has been well sustained. We think that in no year have we had more interesting subjects and never have they been presented with greater ability.

Meetings began on October, 11th, and were held each alternate week till April, 17th, when this section closed its meetings in favor of the Botanical, these two sections covering the year between them. We had but one meeting open to the public. This was well attended and general satisfaction was expressed at the many wonderful and beautiful objects under the microscopes.

The subjects studied during the year were as follows:

*Desmids.*—Their history, structure, distribution and classification, with drawings. These were illustrated by a large variety of specimens. Led by the Secretary.

*Crystallography.*—Specially as it applies to minerals, with specimens viewed both with and without polarized light. Led by Dr. Wolverton.

*The Perisporiaceae.*—Practical classification by members. Led by the Secretary.

Chemical Staining of Vegetable Tissues. Led by Dr. Hotson.

*Mosses*—Their history and dissection. Alternation of Generations, etc. Led by W. T. McClement, M.A.

Bacteriology. Led by Dr. Neu.

Photo-micrography. Led by Mr. Rennie, who had apparatus present and produced a very fine photo-micrograph of a small insect.

Seeds and their microscopical appearance. Led by Mr. Balkwill.

The relations between Gymnosperms, Cryptogams and Angiosperms. Led by Prof. Dearness.

*Animal Hairs.*—The significance of their structure, accompanied by a large number of mounts. Led by Prof. W. E. Saunders.

This section has suffered during the year by the loss of two of its active members, Mr. J. M. Denton whose removal by death we all deeply mourn, and Mr. W. T. McClement, M.A., whose home is now in Chicago.

We look out upon another year with anticipations of greater usefulness than we yet have had. The new rooms which we are to occupy will give the Microscopists an opportunity, such as they never have had, of coming under the public eye. It is the intention of this Section to infuse renewed zeal into their work. The wonders the microscope reveals as well as its delights are almost unknown to the public, and it is our purpose to make our meetings more popular during the fall and winter months.

JAS. H. BOWMAN,
Secretary.

The following paper was then read by Professor Panton, who prefaced his remarks by suggesting that a paper should be written by some one connected with the Society setting forth the advantages of the study of Economic Entomology. He spoke also of the necessity of making the work of the Society better known throughout the country and advised the publication of an abstract of the Annual Report in the daily papers. He also recommended that the conductors of county exhibitions should be urged to offer prizes for the best life-history of injurious insects, with specimens illustrating its various stages and modes of operation.

## TWO INSECT PESTS OF 1896.

By Professor J. Hoyes Panton.

During July of 1896, the attention of the public was, almost, daily directed to a newspaper item referring, either to the "Army Worm" or "Tussock Moth."

The former appeared in many parts of the Province or Ontario; and, in some places, destroyed considerable grain; the latter, was confined to the City of Toronto; where it did much damage to ornamental trees in different parts of the city. The writer having had the opportunity of visiting several of the infested districts, has thought it expedient to place before the Entomological Society of Ontario the results of his investigations.

### The Army Worm.

*Leucania unipuncta.*

We find the army worm reported as present in the township of Eldon, Victoria county, in August 1833, and, common in many places throughout Ontario Province in 1861.

In July, 1894, it did considerable damage in the counties of Lambton and Victoria.

MAP SHEWING

THE

# DISTRIBUTION OF THE ARMY WORM

IN ONTARIO

1899.

The Black portions are the infected districts.

The first notice received at the Agricultural College of its appearance in the Province of Ontario this season, was, in a letter from Marshville, county of Welland, dated July 3rd. On that date, Mr. J. Reavley, living near Marshville, sent some of the worms and a letter describing the attack. The writer visited Mr. Reavley's farm on July 9th, and several others in the townships of Wainfleet, and Humberstone the next day. Throughout the month, letters were daily received, announcing its arrival at different places throughout the Province of Ontario. On the 8th of July, the caterpillars appeared in an oat-field at the Agricultural College, by the 11th, they were very numerous, and reached their maximum on the 15th. From that date a perceptible decrease was daily observed, so, that by the 18th, only a few remained. They began to pass into the pupa stage on the 14th, and, the first moth was observed on 29th of July. Circulars were then sent out, with a view to learn something of the distribution of the army worm at this time; the damage done by it; the means employed to check its progress; and the length of time the caterpillars continued. About 450 replies were received from different townships, throughout the Province.

The accompanying map shows the distribution of this insect pest in Ontario during 1896.

The counties reported as infested are as follows:

*Essex* (5); *Kent* (8); *Elgin* (6); Norfolk (3); *Haldimand* (4); *Welland* (4); Lincoln (1); Wentworth (1); Peel (1); York (3); Ontario (1); Durham (3); Northumberland (1); Hastings (1); Lennox (1); Frontenac (2); Leeds (4); Dundas (1); Russel (1); Carleton (1); Renfrew (2); Parry Sound (1); Muskoka (5); *Simcoe* (6); *Grey* (6); *Bruce* (5); *Huron* (5); *Lambton* (7); Middlesex (4); Oxford (5); Waterloo (2); *Wellington* (5); Perth (3); Cardwell (1); Dufferin (3); Victoria (1); Peterboro (2); Algoma (1); Manitoulin (2); 39 counties and 118 townships.

The counties written in italics are referred to by observers, as suffering considerable loss. The figures after each county indicate the number of townships reported as infested. In many places the damage was slight, as the worms were too late in arriving to do much harm, owing to the advanced condition of the crops attacked. Early sowing is evidently favorable to an escape from disastrous results by an invasion of this pest. Of the crops attacked, oats suffered most; they seem to be a very attractive food for this caterpillar.

From a count made of crops reported attacked, 58 per cent. were oats, 20 per cent. corn, 16 per cent. wheat, and 5 per cent barley. Some observers report a loss of 50 per cent. in oat-fields, while in most of the other cases the damage was comparatively slight. There were a few cases reported in which almost the whole crop was destroyed In one oatfield at the college 50 per cent. of the crop was destroyed. In this case the worms were in all parts of the field before being discovered, and no measures could be adopted to stop their ravages. In most cases the attack did not continue longer than two weeks, in several, it lasted but a few days, and very seldom lasted longer than three weeks.

Several worms are known as the "army worm," but the true one is that which has appeared in so many parts of Ontario during the month of July, 1896. It seems also to have been common in several parts of the United States about the same time.

A despatch in one of our daily papers, dated, Washington, July 16th, reads: "Reports to the agricultural department indicate great ravages by the army worm, in all states from Maine to Wisconsin. The pests have been particularly destructive in New York, Massachusetts and Pennslyvania; there is no doubt that the losses will foot up into the millions." In New York State it appeared in 48 counties, and is reported, as the worst invasion in the history of the state. They were, also, common in Ohio and Illinois.

As grain crops were well advanced before its arrival, in many places of Ontario, the damage done was much less than it might have been. The attack, though in many

counties, was usually confined to small areas in each case, so that on the whole, the loss was not great.

The army worm (figures 45 and 46) is not at all a rare insect, and, from time to time, appears in Canada and the Northern States. We find it referred to as far back as

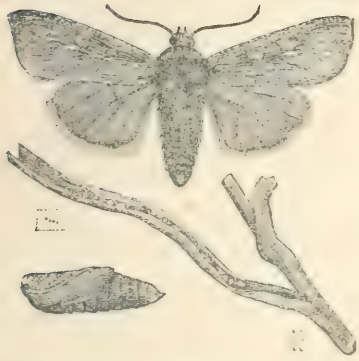

Fig. 45. Eggs, larva, pupa, imago of the army worm (*Leucania unipuncta*).

Fig. 46.

1743, 1861 is known as, "the army worm year," in the United States. During that year it received considerable attention and study. In 1869, it was quite common, also in 1872; 1875 was a bad year, and in 1880 it attracted much attention. The years 1861, 1875, 1880, are those in which the insect seems to have demanded most attention.

The moths are hatched from small, round white, *eggs* laid on wild, or cultivated grasses, and sometimes on grain along the inner base of the blades, where they are doubled, or, between the stalk and its surrounding sheath. The rankest tufts of grass seem to be preferred, but, in some cases, the eggs are found on pieces of cornstalk, and they have been found upon spring and winter grain.

In one of the worst attacked oat fields, at the College, there were many old cornstalks from last year's crop; these, likely, afforded a suitable place for eggs, and this explains the sudden appearance of the caterpillars in all parts of it. This field was the first attacked, and from it many of the catterpillars appeared to have come, in this they were not confined to the edges, as was usually the case in the other fields. The eggs appear to be laid in the evening, or early night. They are deposited in rows, 15 to 20 in a row, on the folded leaf, which serves to conceal them. One female may deposit from 500 to 700 eggs, and seldom takes longer than two or three nights to do so.

The eggs hatch in about a week after being laid. The young caterpillars, in the first stage, can drop by means of a thread, and move with a loop-like motion. At this time, they are of a light greenish color, and thus resemble the plants on which they feed, and escape the notice of their enemies. The *larva* passes through five moults, at intervals of three or four days until it reaches the sixth stage, and is fully developed in about four weeks. The caterpillar is about one and a half inches in length, of a dark gray color, with blackish stripes, and numerous white lines along the back. In many specimens examined by the writer, comparatively few were light colored, until about the close of the attack, and then, the light ones were much more common. Some claim that the dark color is due to exposure. The length of time before complete development of the larva is reached depends a great deal upon temperature, and may vary from 16 to 28 days.

The mid-summer brood usually takes a shorter time than that of the fall. During the day they avoid the rays of the sun by hiding under clods, pieces of boards, chips, etc., and about 5 p. m. they emerge to feed.

In making observations about noon with Mr. Reavley near Marshville, we were surprised that so few worms could be seen at that hour, in a field badly attacked.

But on turning over sods among the oats, we found them in great numbers. We counted over 30 occupying a space no larger than the hand, and, in some parts, more than 50 to the square foot.

In a small patch of late oats on the Reavley farm scarcely a blade was left. The worms abandoned the ripening oats near by, and congregated upon the patch of late oats, no doubt, because they were more succulent.

Every stalk had from one to five worms upon it, and many were eaten to within three inches of the ground. They feed chiefly during the night, and sometimes in cloudy weather. Where they are in great numbers, they make a peculiar sound, which can be heard distinctly, while they are feeding, and cutting off the stalks and heads of grain. Under ordinary conditions, they do not travel, but live much as many other species of the cut worm family do (Noctuidae) to which they belong feeding by night, and hiding by day. However when food becomes scarce, they then undertake to march for new feeding grounds.

They stop at no obstacle, death only will make them halt. A piggery at the college impeded their progress for some days. They never attempted to go around it, but in vain tried to scale its walls, and kept constantly dropping, yet always ready to try the ascent again.

From observations made, as to this rate of travel, while crossing the lane between two fields they were seen to move two feet a minute (40 yards per hour.)

With us they usually appeared active from 4 o'clock p. m., and after that continued to move in great numbers, in all directions, and not in a definite line of march. While feeding, they devoured the leaves and then nipped off the head, which falling to the ground was no longer touched. In attacking some bearded wheat they nibbled off the awns, and only partially fed upon the grain. Oats, timothy, wheat, rye, and barley are their favorite plants; they also feed readily on corn, if young and tender; but they seem to have no inclination for any plants not in the order *gramineae* unless forced by hunger. In a hay field, they will leave the clover and devour every plant of timothy. Several of our fields had excellent crops of young clover; these were left untouched, while the oats and wheat were continually fed upon. In bringing some caterpillars from Humberstone, pea plants were put in the box with them for food, but they were scarcely touched in two days.

The following are results reached during our observations regarding the plants upon which they feed, oats, barley, wheat, and corn they readily devoured.

*Clover.* This was eaten very sparingly and was left if wheat or oats were introduced into the boxes containing caterpillars. Clover was put in the boxes on Monday, by Tuesday night it was hardly touched, but they began to feed upon it on Wednesday. They ate it, only when nothing more attractive was obtainable.

*Lucerne.* This seemed less attractive and was not touched until Thursday. Clover, beans and lucerne were put in the same box; all were avoided at first, but, as hunger increased, the beans were first eaten, then clover, and lucerne last. Beans in the box were not touched till Wednesday.

*Peas.* They were not touched for two days. In a field sown with oats and pease, the latter were not attacked, as long as the oats remained.

*Turnips.* These were left untouched for a day; as soon as a leaf of corn was put in the box, the turnips were at once deserted. A turnip field bordered one of the infested oat fields; the caterpillars in leaving the latter passed through the former without feeding upon a single plant.

*Potatoes,* were left untouched in the boxes.

*Mangels* adjoining one of the invaded fields escaped damage, though caterpillars were constantly passing over and among the plants. In the boxes they were slightly nibbled.

*Beets* remained untouched for three days.

*Buckwheat* was taken after a day's fast, when nothing else was presented; but as soon as corn was added they immediately left the buckwheat to feed upon it.

*Carrots* escaped for a day, but in two days were fairly well eaten. They would not touch carrots in the presence of grass or corn.

*Cucumber* vines were preferred to beans, and were almost as readily eaten as some corn leaves.

*Celery* was continually avoided, and the worms began to devour one another before they would feed upon it.

*Maple* leaves were avoided, but some apple were sparingly fed upon, after two day's fast.

*Grape* leaves were taken, when no other food was present.

*Strawberry* leaves remained untouched till the third day.

*Currant* leaves were avoided for three days and then eaten, but sparingly.

*Canadian* thistles remained untouched.

When no food was put in the boxes containing caterpillars, in 24 hours they began to devour one another. Frequently in boxes containing unattractive food, heads were found among the leaves, these no doubt belonged to bodies that had been devoured by the survivors.

From these experiments, it would seem that the food of the Army worm is largely restricted to the *graminea*, and that they will not feed upon plants from the *leguminosæ* and some other orders unless pressed by hunger. Consequently, there is little fear of any other farm crop being attacked than oats, wheat, timothy, rye, barley and corn.

Having become fully developed caterpillars at the end of three or four weeks from the time of being hatched, they pass into the ground, just below the surface or under stones, clods, etc., and enter the *pupa* stage. In a field at the College many pupa cases were found in cracks in the soil.

This condition lasts two weeks, and then the perfect insect (*imago*) emerges from its pupa case.

The moth is fawn-colored, with a small white spot near the centre of each front wing. The wings when spread measure one and a half inches across.

It conceals itself during the day and begins to fly towards night. Many could be seen flying around the electric lights in Guelph about the second week in August. The female has a more pointed abdomen than the male and her antennæ are smoother, and less hairy, than those of the male.

The moths feeding on flowers are more likely to be found near low ground, and hence they appear to come from such places. There appear to be three generations represented in a season or two broods in a year; the first wintering as larvæ, the second forming the "Armies," and the third larvæ derived from these after the imago has been developed; the last wintering as larvæ. The army worm usually winters in the larval form, but sometimes as the moth.

In the vicinity of our fields at Guelph, where the caterpillars were so numerous, we have as yet (Oct. 18th) failed to find any of the second brood.

The following stages (taken from Riley's report 1882) in the life history of an Army worm gives a good idea of the length of time that elapses in passing from the *egg* to *imago*. *Eggs* laid May 4th, hatched May 11th, 1st moult May 17th, 2nd moult May 20th, 3rd moult May 23rd, 4th moult May 26th, 5th moult May 29th: *pupa* June 2nd, *imago* June 17th.

At the College the first caterpillars were observed on the 8th of July; on the 9th there was a preceptible increase, 12th a marked increase; 13th large numbers; 14th, 15th still very numerous; on the 16th a perceptible decrease; 17th the decrease quite marked; 18th, 19th comparatively few; 20th only a few stragglers could be seen, and, most of these, were light colored. Towards the close of the attack, a bacterial disease seemed to destroy some of them. It is a matter of surprise to many how these caterpillars appear and disappear so suddenly, but a little reflection upon their life history explains the mystery.

Hidden in the grass by day, and feeding at night, they escape observation. If one or more dry seasons come, they multiply rapidly. Large numbers winter in the larval condition, and during the following spring moths appear and lay many eggs, which hatch and give rise to innumerable caterpillars which from a scarcity of food are forced to "march" and thus become suddenly conspicuous. These develop, pass into the ground to enter the pupa stage, and thus disappear suddenly.

Dry weather seems favourable for their development. Consequently a dry season, followed by a mild winter, and a dry summer, as in 1895, and 1896, supplied conditions very suitable for increase of the army worm in many parts of Ontario.

Having referred to the distribution, and life history of this insect, and some of our investigations in connection with it, we may now direct attention to some of the means by which it is, and may be prevented from being a source of alarm.

*Natural remedies.* The army worm has many enemies; nearly all insectivorous birds relish it as a sweet morsel, and are ready to feed upon it the moment it becomes conspicuous. In Guelph, this season, the English sparrows congregated in great numbers, where the caterpillars were numerous, and fed voraciously upon them. In some parts of the United States the bobolink is called the army worm bird.

Fig. 47.
*Tiger Beetle.*

Fig. 48.
(*Calosoma calidum.*)
[After Riley.]

Fig. 49.
Ground beetle (*Harpalus caliginosus*)
[After Riley.]

Fig. 50.
*Nemoraea leucaniae.*

The ground beetles, *Calosoma calidum*, fig 48, and *Harpalus caliginosus*, fig 49, especially the former, were very numerous in the infested fields. Tiger beetles (*Cincin-*

*delidæ*) fig 47, also prey upon them. But, probably, one of the greatest insect friends to assist in destroying the army worm is the red tailed tachina fly (*Nemorœa leucaniæ*) fig. 50. In the infested fields of Wainfleet near Marshville, the writer found many of the caterpillars, bearing the eggs of this insect upon them. In some cases, several eggs upon a caterpillar, and the flies themselves buzzing around. At the college we seldom saw more than a single egg upon a caterpillar and this was usually near the head, in a position not easily reached by the worm to tear it off. We succeeded in developing quite a number of the flies. Shortly after the egg is deposited it hatches, and the small white grub bores into the worm (host) and feeds upon it, developing at the expense of the host's life. At first, none of the minute white eggs of the fly could be seen, though many caterpillars were examined, but in a few days, some were observed which indicated that a benefactor had arrived. This beneficial insect resembles a large house fly, but has a red tip at the end of the body. The first one appeared in our breeding cages Aug. 4th; the first army worm moth July 29th. Some observers have seen the yellow-tailed tachina fly (*Tachina flavicauda*) preying upon the army worm.

While developing the caterpillars we succeeded in securing several specimens of *Ichneumon leucaniæ*, another parasite, and one of *Ophion purgatus*.

Altogether, investigators have found some twenty different species of insects that attack and assist greatly in destroying the army worm.

It will thus be seen that the moment these insects emerge from their hiding places in grass fields, they are pursued by a host of relentless foes in the form of birds, predaceous beetles and parasitic flies.

*Artificial remedies.* 1. As this insect breeds largely in rank grass, such as is seen bordering swamps, it is well, where practicable, to burn such in the fall or spring. Clean cultivation, and the keeping of fence corners, etc., clean, should be followed, as far as possible.

2. Where the worm has appeared its progress may be stopped by plowing a furrow with its perpendicular side next the field to be protected, or a ditch may be dug in the same position. Holes dug at intervals of ten to fifteen feet, in the furrow or ditch will be useful in catching the worms, failing to climb the sides, and wandering aimlessly along the furrow. The worms collected in the furrow or ditch may be des royed as follows: (a) Plowing a furrow, so as to bury them; (b) Sprinkling coal oil upon them; (c) Scattering straw over them and firing it; (d) Dragging a heavy pole along the ditch.

3. Where Paris green may be safely used a strong mixture (one pound to seventy-five gallons water) sprayed upon the plants likely to be first attacked will be effective. Windrows of green oats sprinkled in this way in the line of march will destroy myriads as they feed upon their favorite food. At the College immense numbers were destroyed in this way in a short time. By actual count made by the writer July 18th, 2,560 dead worms lay on a single square foot beneath the windrows.

4. Sometimes, conditions are such, that great numbers may be crushed under a roller.

5. Windrows of straw sometimes afford a place of concealment for the worms, and may be fired so as to destroy many beneath them.

6. Some recommend spraying several times a day with kerosene emulsion, a strip of ground over which the insects are passing.

Frequent reference has been made in newspapers to the use of salt or lime as an effectual barrier to their progress. We experimented with both, and found that in each case the worms moved over and through the lime and salt, apparently without the least difficulty.

## Tussock Moth.

*Orgyia leucostigma.*

The Tussock moth is another insect pest which has attracted considerable attention during July, 1896. Though not widespread in its attack, it has occupied considerable space in the newspapers.

Its ravages have been largely confined to the defoliation of shade trees in the city of Toronto, and hence, appearing at a place where important daily papers are published, it received much notice.

Although in Toronto this caterpillar confined itself largely to an attack upon the horse-chestnut trees, yet it feeds upon the foliage of other trees. It has been found doing much injury to the elm and apple, and also feeding upon the plum, pear, maple, oak, walnut, butternut, locust and spruce. Few, if any trees, are exempt from its attack. It made its appearance in Toronto about July 1st, and remained for about three weeks, during which time it defoliated many of the horse-chestnut trees on Jarvis street, College avenue and in some other parts of the city. The writer visited the city July 27th, and had an opportunity to investigate its ravages.

This insect is readily identified in all its stages—*egg*, *larva*, *pupa* and *imago*.

Fig. 51. Fig. 52. Fig. 53. Fig. 54.

*Orgyia leucostigma.* *a* Adult female on cocoon. *b* Young larva. *c* Female pupa. *d* Male pupa. *e* Adult male (after Riley).

The eggs appear in masses (400-700) covered with a froth-like substance, that dries and hardens upon them, and serves to protect them from injury by the weather (rain), predaceous insects, and even birds. This covering is very white, and thus renders the

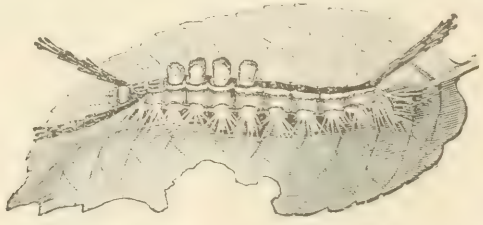

Fig. 55. *O. leucostigma*, full-grown larva (after Riley).

egg masses quite conspicuous at a considerable distance where they are deposited. These masses may be found on the trunk of the trees, in crevices of the bark, on the larger limbs, or in sheltered spots, such as fence boards and on bunches of dead leaves hanging upon the tree. In Toronto, the trunks of the horse-chestnut trees attacked presented in some cases quite a spotted appearance, from the innumerable white masses of eggs and cocoons attached to the bark.

As soon as the *eggs* hatch, tiny *caterpillars* (fig. 51, *b*) make their appearance (usually about June), and, as development proceeds, they pass through a series of molts, three—(one

a week). After the third, the larva (fig. 55) presents all the striking characters which make it so readily identified. The head, and the spots on the 9th and 10th segments are a bright red color: the back is black, with yellow lines along the sides: the body is sparsely covered with long, pale yellow hairs, giving the caterpillars a yellowish appearance. Four cream colored dense tufts of hair form a row upon the back of the 4th, 5th, 6th and 7th segments: while from each side of the head a long black tuft extends forward, and a single one projects backward from the posterior end of the body.

The young caterpillars soon after hatching scatter over the trees, feeding upon the leaves: when disturbed, they drop by a silken thread to the ground, wander about, many ascending the tree again.

Having reached full development, which takes about six weeks, during which they have reached a little over an inch in length, they enter the *pupa* stage (figs. 52 and 53), which lasts less than two weeks. The cocoon of the male is whitish, or yellowish, and very thin: while that of the female is much larger, of a gray color, and firmer texture. The male chrysalis is brownish, and shows rudimentary wings: the female is much larger, and shows no wing sheaths.

The cocoons may be found in crevices of the bark on the trunk, and large limbs, or in sheltered spots near where the caterpillars have been feeding. In Toronto the trunks of the trees were in some cases almost covered with them, and very many could be found beneath the window sills and the top boards of fences.

In about a week the *imago* appears. The male moth (fig. 54) is winged, and measures about 1¼ inches across the expanded wings: has feathery antennæ and very hairy front legs. The general color is ash-grey: the front wings are crossed by heavy bands of darker shade, with two black markings on the outer edge, near the tip, and a white spot on the inner edge, also near the tip. The writer succeeded in getting very few of the males, but numerous females.

The female (fig. 51) is wingless, of a pale gray color: short antennæ, not feathered. She is scarcely able to walk. Soon after emerging from the cocoon she begins to lay her eggs upon the old cocoon, and covers them with a frothy substance: as soon as this is done her life work ends, she drops exhausted and dies. The winter is usually spent in the egg stage, when clusters of them may be seen upon the trees.

Much depends on the season whether there will be one or two broods (a brood occupies about two months in completing its development).

Natural remedies.—Very few birds care to swallow this hairy caterpillar: the only ones that seem to feed upon it are the robin, Baltimore oriole, and the yellow-billed cuckoo. Some bugs (*Prionidus cristatus*) occasionally attack it. A large number of parasites follow in its trail, and do good work in checking its increase.

A great many ichneumons (*Pimpla inquisitor*) developed among the cocoons brought from Toronto for further examination.

Two Tachina flies also were developed in the cages. They resembled those of the army worm, but were smaller,

Artificial remedies.—1. Spraying with Paris green mixture (1 lb. in 150-200 gallons of water) will destroy the caterpillars feeding upon the leaves. If there is any danger of injuring the foliage, 1 lb. to 160 gallons of water, to which is added 1 lb. of quicklime, may be used.

2. Gather the eggs in winter, as they are very conspicuous at that time, and may be readily destroyed.

3. Bands of adhesive material may be painted around the trunk. These will prevent the caterpillars ascending the tree.

This caterpillar, though capable of doing much injury, is not considered to be a difficult one to control. Spraying as above is very effective, and this followed by collecting and destroying egg masses when the leaves have fallen, cannot fail to be successful.

In the case of the attack at Toronto, active measures were not adopted until the caterpillars had almost completed development, and were about to enter the pupa condition.

Energetic efforts were then put forth to destroy the innumerable cocoons that were soon visible. No doubt thousands of egg masses were destroyed upon the trunks of the trees, in the work of rubbing the bark with a coarse brush. At first a band of adhesive material was painted upon the trunks, and thus many caterpillars were prevented reascending the tree, but as soon as cocoons were discovered, this method was abandoned and that of destroying the cocoons followed. It will be well for those interested to be on the watch the coming season, and if caterpillars appear, at once resort to spraying. During the winter all egg masses should be destroyed as far as possible.

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Dr. Bethune thought that the Society should be congratulated upon being favoured with so valuable a paper as that to which they had just listened. There could hardly have been presented a more complete life-history of these two species of injurious insects and he was sure that its publication in the Annual Report would prove most useful to a large number of readers. He then proceeded to give his experience of the army-worm this year. (See his paper, Notes on Insects of the year 1896, page 55). At the recent meeting of the American Association of Economic Entomologists held in Buffalo, N. Y., in August last, at which he and Dr. Fletcher had the honor of representing the Society, the army worm formed one of the most conspicuous features among the reports on the season given by many of the members present. Dr. Lintner, State Entomologist of New York, reported its occurrence in forty-eight out of the sixty counties in the state, and considered it the worst insect attack in his experience. Mr. Kirkland stated that it had been very abundant and destructive in Massachussetts, especially to cranberry plants; he estimated the damage done in that state alone at $250,000 at least. In New Jersey, Prof. J. B. Smith had found it numerous in isolated fields, but did not consider that very much damage had been done. Mr. Johnson reported that it was very destructive in Illinois, but its numbers were materially reduced in June, by a fungous or bacterial disease which spread rapidly among them. Prof. Duggar had observed the same thing in Minnesota and considered that the disease was similar to the febrine of silk-worms. Prof. Webster considered that the chinch-bug was the worst insect of the year in Ohio, but the army-worm came second, and was very abundant and destructive. From all this testimony it was evident that the army-worm was wide spread throughout the states adjacent to Ontario; he did not, however, think that we need dread a very serious outbreak next year, as experience taught us that natural enemies so reduced their numbers as to make their ravages insignificant in the year following one of great abundance, nevertheless it would be well to instruct the farmers that their ground should be well cleaned up, and plowed up as far as possible in the fall in order to destroy the hibernating insects.

The Rev. T. W. Fyles regarded Prof. Panton's paper as a very valuable one to the community, and was personally grateful for the information it contained. He came from England to Canada in 1861, which was an army-worm year, and while visiting a friend at Côte des Neiges took a walk into the country. On his way he noticed a high wall around the college grounds on which was a broad black stripe of tar about three feet from the ground. This struck him as very remarkable, and on asking passers by what it was for, he could get no information. Subsequently he learnt that it was intended as a barrier to keep out the army-worm, and no doubt it proved a very effective check. He thought that a roller might be used with great advantage when the worms were crossing a hard surface, such as a road or lane. The tussock moth he had not found in Quebec until three years ago, when it became very abundant and the willow-trees were covered with the caterpillars. Another closely allied species, *Orgyia nova* had always been oommon in that province.

Mr. Dearness, the President, discussed the question of the migration of the army-worm from marshy lands in dry seasons and mentioned some instances in confirmation of this view.

Mr. H. H. Lyman then read a paper on "The preparatory stages of *Erebia epipsodea*, Butler." (See *Canadian Entomologist*, volume xxviii, November, 1896, pages 274-278.)

Mr. Lyman also presented a paper on some remarkable aberrations in *Colias philodice* and *Vanessa antiopa*, and exhibited the singular specimens referred to. Those of the former species were taken by Mr. Dwight Brainerd, of Montreal, at Edgartown, Mass., in August last. (See *Canadian Entomologist*, volume xxviii, December, 1896, pages 505-6.); the suffused black specimen of *V. antiopa* was captured in British Columbia.

### Election of Officers.

The following gentlemen were elected officers for the ensuing year: (See page 2.)

## AFTERNOON SESSION.

The meeting was called to order by the President, Mr. J. W. Dearness, at 2.30 o'clock p.m. The following paper was then read by Dr. Bethune:

## NOTES ON INSECTS OF THE YEAR 1896.

By Rev. C. J. S. Bethune, Port Hope.

### The Army Worm.

The season of 1896 is chiefly remarkable, from an entomological point of view, for the outbreak of the army-worm in this Province of Ontario. The insect, in its winged state at any rate, has long been familiar to every collector and is every year more or less abundant. We have all read accounts from time to time of its ravages in various parts of the United States, but hitherto we have been free from any serious invasions in this country. As this year's outbreak is being fully discussed by others, I shall merely mention what has come under my own observation.

On the 17th of July I received the following note from the Rev. Stearne Tighe of Emerald, Amherst Island: "I send you to-day by mail, specimens of a grub that is destroying all grain, etc, on this Island. What is it? Is there any way of destroying it, or arresting its ravages? This Island contains 15,000 square acres, and is at its nearest point two miles from the mainland." I at once recognized the specimens to be the notorious "army-worm" (*Leucania unipunctata*), which had already been reported in the newspapers as having appeared in injurious numbers in various parts of the province. I immediately wrote to Mr. Tighe and informed him of the usual remedies, namely, plowing a deep furrow to stop the onward march of the "army," if it were moving on from field to field, and destroying the caterpillars thus collected by burning with straw spread along the furrow or dragging a log of wood through it; or, if the worms were congregated in a field of grain, treating them with Paris green in order to prevent their going further. The specimens sent to me proved to be badly infested with maggots, the larvæ of a Tachina fly, and only one in consequence succeeded in reaching the chrysalis state, the rest being destroyed by their parasites. If the same proportion of worms were attacked in the fields of Amherst Island, there is not much danger of a repetition of the outbreak next year.

A few days later in the month, specimens of the same "army-worm" were brought to me from a field of grain adjoining my own garden at Port Hope. They were then fully grown and had done a great deal of damage by gnawing the soft grain in the wheat-ears. The farmer, whose crop was thus injured, informed me that the worms had crossed the road in the form of an "army" on a Sunday afternoon (where they had come from no one had observed) and at once proceeded to scatter over the wheat field and climb up

the stalks to the ears. Fortunately the grain was rapidly ripening and soon became too hard for the jaws of the caterpillar and the loss was not so serious as might have been anticipated.

About the first of August the moths began to appear and for a couple of weeks they swarmed in countless myraids. Some Tartarean honey-suckle bushes in my garden were laden with ripened berries; these attracted the moths to such an extent that the twigs were covered with them towards evening and during the night. On being disturbed by shaking the bushes, they would fly out in clouds. The moth has always been familiar to us, and is often taken by collectors when "sugaring" in the summer, but I never before saw it in such abundance.

On writing to Mr. Tighe about this time, recommending the destruction of the moths, which could be attracted by sugar or light, and enclosing specimens in order that there might be no difficulty in identifying them, he replied that the worms had disappeared shortly after his previous communication and no further damage had been done by them. They had, of course, completed their larval period and had gone into the ground to transform into chrysalids, large numbers of them then dying from the internal ravages of parasites.

In addition to the good work of the Tachina flies, which resemble the ordinary house-fly and appeared in swarms over infested fields, the worms were attacked by several species of predaceous insects, and were also devoured in large numbers by the English sparrow, which in some localities visited the army-worm districts in great flocks.

## The Tussock-worm.

Another insect which attracted much attention this summer and brought out many articles and letters in the newspapers, was the Tussock-worm (*Orgyia leucostigma*), which defoliated many shade trees in the streets of Toronto. As it has been fully dealt with already by Prof. Panton in his valuable and interesting address, I need not go over the same ground again. During my occasional visits to Toronto, I have noticed this insect for several years past and have drawn the attention of friends to its injurious work on their shade trees. It ought not to be a difficult insect to control as it cannot spread with any great rapidity owing to the fact that the female is wingless and can only crawl a short distance. The cocoons are usually so conspicuous in the autumn after the leaves have fallen and during the winter, that boys could be employed to scrape them off and destroy them. A tree once cleared will remain for a long time free from any further attack. In Port Hope the insect is common enough, but has never been so abundant as to cause any appreciable injury.

## The Black Potato Beetle.

At the end of June I received from the Editor of the *Mattawa Tribune*, some specimens of a beetle that was attacking the potato plant in myriads in the neighborhood of Mattawa, Ont. They proved to be the black blistering beetle (*Macrobasis unicolor*, Kirby), a species that belongs to to the same family, Meloidæ, as the "Spanish-flies," which are used for blistering purposes by the medical profession, and that possesses the same vesicating properties. The insect (Fig. 56.) is long and slender, about half an inch in length, ack in colour and covered with fine whitish hairs which give it an ashen appearance; these hairs are easily rubbed off and leave the insect quite black. It is a northern species and is much more commonly found in the upper Ottawa region and on Manitoulin Island than in Southern Ontario. In the neighborhood of Montreal it has been very abundant

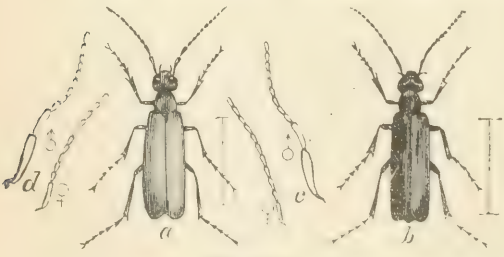

Fig. 56.

on Windsor, or English broad beans, and caused much damage to these plants in some gardens. While at times very destructive to these plants and to potatoes, it is unlike most injurious insects in possessing one good habit at least, and that is its practice of feeding upon the larvæ of the Colorado potato beetle. The question may therefore arise as to whether it does more good than harm. If the evidence should be adverse, then it may be dealt with precisely as its prey, and the "two birds be killed with one stone" by an aplication of Paris green in the usual manner. As far as I know, the black blistering beetle has only one brood in the year, and therefore only attacks the food-plant for a limited period, whereas the Colorado beetle has a succession of broods throughout the season, and never ceases its depredations from the time when the plants first appear above the soil in spring, till they are ready to be dug in the autumn.

## Miscellaneous.

For some ten years or so the apple-tree tent-caterpillar (*Clisiocampa Americana*, Harris) (Fig. 57) has not been seen in the neighborhood of Port Hope, but this year it has put in an appearance again and I have observed a few of the moths. In Peterborough and about Toronto it has been quite numerous and destructive. Formerly it was one of the worst pests of the fruit grower that we had, and its webs were to be seen in spring and early summer on apple, pear, plum and cherry trees, and especially upon the wild varieties of the two latter. One spring, however, they were practically exterminated. The tiny caterpillars emerged from the eggs, which are laid in "bracelets" (Fig. 57, *c*) around twigs of the affected tree, at the same time as the leaf buds first opened and at once began to devour them A few days later there came a severe frost which was too much for the tender little worms and they were all killed, giving us an immunity from the pest for a number of years. Now that they have begun to appear again, it will be well for fruit growers to be on the look out next spring and to destroy every "tent" with its inmates as soon as it is discovered.

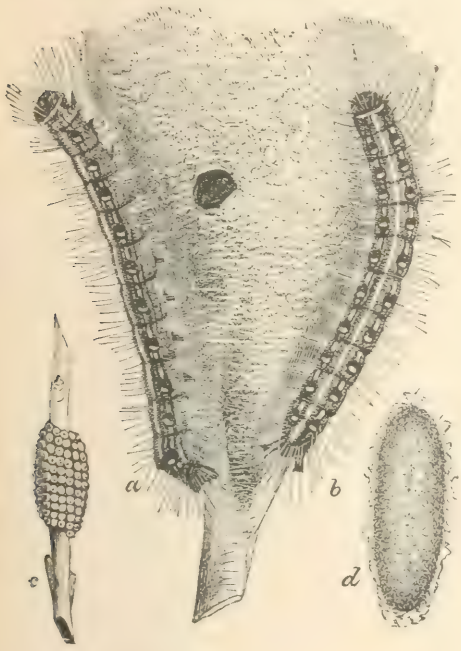


Fig. 57.

Grasshoppers, which were very numerous and did a great deal of damage to pastures, and hay and oat crops, during the two preceding years, were this season remarkably few in numbers and caused no appreciable injury.

Various species of plant-lice (*Aphis*) were excessively abundant and injurious to plants of all kinds during the summer; the long continued hot and dry weather being very favorable to their increase. Even such weeds as the Lamb's-quarter were covered with them and many cultivated flowers in gardens suffered severely.

The Cigar case bearer (*Coleophora Fletcherella*) was found in June upon some neglected apple trees on the edge of a field near Port Hope. This pest which has been a serious one in some localities during the last few years, is evidently spreading in Ontario and should be carefully looked for in spring and early summer. A full account of the insect and the best modes of dealing with it is given in the report for 1895 of Dr. James Fletcher, the Dominion Entomologist and Botanist.

The Fall Web-Worm (*Hyphantria textor*), (Fig. 8) which has been for many years excessively abundant on ash, elm and many fruit trees, has this year been quite scarce about Port Hope, but in the neighborhood of London,—as our president Mr. Dearness relates—it has been conspicuously prevalent and many tree have been covered with immense webs. How to account for these remarkable changes in the numbers of injurious insects from scarcity or abundance in one year to the reverse in the next is one of those puzzles which may well employ the attention of the thoughtful entomologist. Sudden changes of temperature as we have seen in the case of the apple-tree tent caterpillar, very hot and very dry weather, an unusally wet and cold season, violent storms, all these no doubt have great influence in reducing the numbers or favoring the increase of some species of insects, and in addition,—perhaps most of all—the increase of the parasites that prey upon the noxious species, and the spread of infectious diseases are great factors in the problem. It can only be solved by patient daily observations of a particular species carried on from year to year by more than one investigator. This is a field of work open to all and one that may result in the acquisition of a knowledge that will be of very great scientific and practical value.

Dr. Bethune also referred to the large number of rare butterflies that had been captured this year and gave a list of their names, with localities and dates. He then read a paper by Prof. Webster, of Wooster, Ohio, who was unable to be present, on "Warning colors, protective mimicry and protective coloration."

It was then moved by W. E. Saunders, and seconded by J. A. Balkwill, that "The Entomological Society now in Session at its annual meeting, having learnt of the sympathetic statement of its work and aims made by the Hon. John Dryden, Minister of Agriculture, at the time when the grant to the Society was under the consideration of the Committee of the Ontario Legislature, desires the Secretary to convey to the Honorable Minister its sincere appreciation of his kind interest."—*Carried.*

Moved by J. A. Balkwill, seconded by W. E. Saunders, that the Secretary be requested to communicate with the Board of the Western Fair Association, requesting them to continue to offer encouragement to the Schools to make exhibits of the life-history of insects, and that their influence be used on the Fair Boards to encourage similar exhibits.—*Carried.*

Moved by D. Arnott, seconded by W. E. Saunders, that Messrs. Rennie, Balkwill and the President, be appointed a committee to meet the Board of the Young Men's Christian Association and endeavor to make satisfactory arrangements with regard to the renting of a room for the Society, and the approaches thereto.—*Carried.*

The meeting then adjourned, after having spent much enjoyable time during the sessions on both days in exhibiting rare captures, examining the books and specimens of the Society, and comparing notes on many interesting entomological subjects.

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## INSECT INJURIES TO ONTARIO CROPS IN 1896.

By James Fletcher, Dominion Entomologist, Ottawa.

There is never a season when serious loss does not occur in some part of Canada from the attacks of our numerous insect enemies. There is, however, during a succession of years great fluctuation in the amount of insect presence in any one locality. New pests develop or old ones reappear after a period of absence, and then again sometimes suddenly disappear. Day by day additions are being made to the mass of accumulated knowledge by the use of which the injuries of insects can be prevented. The importance

of the study of Practical or Economic Entomology is now widely recognized by all the civilized nations of the world. This confidence in a branch of science not taken up by many investigators is undoubtedly due to the fact that those concerned have found by experience that they are able to receive useful advice from those who have made a special study of the lives of insects, by which they are enabled to save a larger proportion of their crops than would otherwise be the case, and thus increase their incomes.

It requires many years of close study and constant observation before one can become familar with all the different attacks by insects which may demand the attention of a farmer or gardener even in a single season; but the general principles upon which remedies are applied can soon be learnt, so as to prevent foolish mistakes. A fact which must never be forgotten is that all insects have their mouth parts formed after one or other of two plans only. In one class, solid food is eaten by means of jaws, with which it is bitten off from the object attacked; in the other class, liquid food, such as the sap of plants or the blood of animals, is sucked by means of a hollow tube-like beak. It is most necessary to remember these elementary facts, because in accordance with them all active remedies are devised. For biting insects, some poisonous material is placed on their food, so that when this food is eaten by the insects they may be destroyed. For sucking insects, this method would be useless, because, having no jaws, they can feed only on liquids, for which they have to sink their sharp beak like feeding tubes beneath the surface of the object attacked. For this class of insects, substances which will kill by simply coming in contact with their bodies must be used.

Farm crops in Ontario during the past year have not suffered from any new pests, but there has been as usual considerable loss, which might have been prevented, had the attacks been promptly reported and the proper remedial measures adopted. The three most striking infestations of the season were grasshoppers, army-worm and a local outbreak or rather increased abundance of the Tussock moth in Toronto. Under the headings of the different classes of crops, attention is called here to those which have been most frequently complained of.

*Cereals.* The wheat crop of the Province has been little affected by insects, and although different kinds have been mentioned by several correspondents, there has been no serious outbreak. The Wheat-stem Maggot (*Meromyza Americana*, Fitch), was conspicuously less abundant and the American frit-fly (*Oscinis variabilis*, Loew.) was not only not mentioned, but it was impossible to obtain a single specimen for examination even in localities which were badly infested in 1890

Grasshoppers were stated to be the cause of some injury to wheat, but the crops most injured by these insects were oats and hay. It is well to make special mention of the Hessian fly (*Cecidomyia destructor*, Say), fig. 58, which has been present in several places, and farmers must be prepared next year, if its injuries increase, to adopt the well-known remedies of sowing their fall wheat later (about the third week in September) and burning carefully all screenings and dust from threshing machines. The Wheat Midge (*Diplosis tritici*, Kirby), fig. 59, which has been heard little of for the past six or seven years, again put in an appearance in one or two localities. This, also, will be largely controlled by the systematic burning of the rubbish from threshing machines.

Fig. 58.

Oats have, perhaps, suffered from insects more than any other of the small grains The Grain Aphis (*Siphonophora avenæ*, Fab.) was unusually abundant in some places. Oats were also among the crops mentioned by several who wrote concerning the army-worm (*Leucania unipuncta*, Haw.) One of the most notable outbreaks of the year 1896 was by the

caterpillars of this insect. There was hardly a county in the Province where it was not reported either as a caterpilar attacking crops or as a moth which had drawn attention by its excessive numbers. This pest has been treated at length by Prof. Panton in the present report, so need not be mentioned further here, except to draw the attention of those interested to the excellent bulletin lately issued by Prof. Clarence M. Weed of the New Hampshire Agricultural Experiment Station. It is interesting to learn from this bulletin that in 1770 in the celebrated occurrence of the army worm in New Hampshire, the same remedies which we most rely on to-day, namely, trenching around fields infested and destroying the caterpillars in pits dug at intervals in the trenches were practised by the farmers of that State. As is almost invariably the case, the superabundance of the army-worm this year was much reduced by the natural enemies which always prey upon this species.

Fig. 59.

At the late meeting of the Association of Economic Entomologists held at Buffalo, N.Y., Dr. J. B. Smith stated that the army-worm had appeared in New Jersey in some numbers, but only in isolated localities. In Canada, in almost every instance where invasions of this insect have been recorded, the injury has been done by a brood which appears in the larval form during the month of July and in the beginning of August; but Dr. Smith stated that it was not always the same brood which did the damage in New Jersey The first brood seemed to be the injurious one in a southern county of the State, reports having been received as early as May. At other localities in the State injury was noted in July and as late as early in August. This is practically the same as is the case in some of our northern counties of Ontario The most interesting record, however, is given by Mr. A. H. Kirkland, of the Massachusetts Gypsy Moth Commission, who stated that "the army-worm had been seriously injurious in many parts of Massachusetts and had damaged a large portion of the cranberry crop. He writes Sept. 3 that at Hingham, Mass., a third brood of army-worms was then threatening to be as destructive as any that preceded it. He found them at that time of all stages from quite young to nearly mature." (*Entomological News, VII*, 1896, p. 310.)

*Fodder crops.* Early in the season grasshoppers of the three common species, the Red-legged locust, fig. 60, the Two-striped locust, and the Lesser Migratory locust, were noticed to be remarkably abundant throughout Ontario and Quebec and in parts of Nova Scotia. These species are always somewhat prevalent, but great anxiety was felt in June last when their ravages were seen in pastures and hay fields. Clover was badly eaten in some districts early in the month and also wheat, oats and barley. Later in the summer corn, beans, turnips, and even hops were attacked. There was every appearance in July that the losses would even exceed those of 1895, but early in August it was clear that for some reason the grasshoppers were much less numerous than they had been. Several correspondents made the same report, and a few of them observed that parasites were waging an effective warfare against the locust tribes. Doubtless the sudden disappearance of these pests was due to the great increase of four of their natural enemies. One of these is a fungous disease (*Empusa grylli* [Fresenius] Nowakowski), which causes its victims to crawl up to the tops of stalks of grasses and other plants, where, grasping the stem firmly with their legs they die and their bodies become rapidly filled with a dry, mealy substance, which is really myriads of the spores of the parasitic fungus. The body of the locust soon dries up and the spores are distributed by the wind, each mummified carcass thus becoming a source of infection to all other locusts which come near it. In addition to the above fungus three other parasites—insects—were unusually abundant. One of these was a Tachina fly, fig 61, which was described as following the locusts closely and darting down, laying its white

Fig. 60.

eggs on their bodies. From these eggs in a short time hatch white maggots which feed inside the bodies of their hosts until full grown, when they force their way out and, falling to the ground, which they enter a short distance, they pupate, and change to flies either the same autumn or the next spring. Prof. Riley describes graphically the operation of egg-laying by one of these Tachina flies, and much the same thing was observed by Mr. J. E. Richardson of Princeton, Ont., last July. Prof. Riley says: "The slow-flying locusts are attacked while flying, and it is quite amusing* to watch the frantic efforts which one of them haunted by a Tachina fly, will make to evade its enemy. The fly buzzes around waiting her opportunity, and, when the locust jumps or flies, darts at it and attempts to attach her egg under the wing or on the neck. The attempt frequently fails, but she perseveres until she usually accomplishes her object. With those locusts which fly readily, she has even greater difficulty; but, though the locust tacks suddenly in all directions in its efforts to avoid her, she circles close around it and generally succeeds in accomplishing her purpose, either while the locust is yet on the wing, or, more often, just as it alights from a flight or a hop." Locusts infested with these parasites are more languid than they otherwise would be; yet they seldom die until their unwelcome guests leave them of their own accord.

Fig. 61.

Probably the most efficient worker in keeping down the undue increase of grasshoppers is the Locust Mite (*Trombidium locustarum*, Riley), and it has been extremely prevalent and very often observed during the past summer. As it is seen attached to grasshoppers, generally at the base of the wings, it bears little resemblance to an insect and few recognize it as such the first time they examine it. The bright red swollen bag-like bodies are really the larval form of the Locust Mite, and are possessed of six weak legs, as may be discovered by examining them closely. (See figs. 62 and 63, opp. page 64). The mouth parts are very poorly developed, and, when once the mites have attached themselves to their host by means of their beak-like mouths, they remain unmoved, living on its blood until full grown. By these little parasites vast numbers of locusts are destroyed. When ready to assume the pupal condition, they detach themselves, and, falling to the ground, crawl under some shelter to complete their transformations. Gradually swelling and changing their form slightly, the mites pass through the pupal stage inside the larval skin; new legs, mouths and other organs, of a different nature to those possessed by the larvæ, are formed under the old skin, and finally this latter bursts and releases a creature very different from and much more active than the larval form. It has now eight legs and is a true *Trombidium*. The perfect mites are very conspicuous and draw attention by their velvety, bright scarlet bodies; they are frequently spoken of as "Scarlet Spiders" when sent in for identification. In this stage they are equally useful allies to the farmer as in the larval form, for while they do not attack the full grown locusts, they seek out their eggs in the ground and destroy large numbers of them. They pass the winter in the mature form and are frequently seen crawling over the ground in spring.

In May the female lays a mass of between 300 and 400 small, round, orange eggs in a cavity an inch or two beneath the surface of the ground. The young, as stated above, have six legs only and are at first exceedingly minute but very active. They crawl about until they find a locust, to which they attach themselves, mostly at the base or along the principal veins of the wings. Here they swell by degrees until their legs become almost invisible, and this is the time they are most often noticed. There has been considerable confusion as to what is the proper name of this mite. In the first place, it was not known, until Prof. Riley in 1877 worked out the life history of this species, that the bag-like bodies with six legs only, which were so often found attached to locusts, and which were classified under an entirely different genus, *Atoma* (= *Astoma*) of Latreille, were merely the immature condition of the little red mites with eight legs which were found devouring the eggs of locusts in the ground, and when this fact was discovered there was still room for con-

* The locust might well say here, "It's fun for you but death to me."

fusion as to whether it should be called by the specific name first given to the larva when named *Atoma gryllaria* by Dr. Le Baron in 1872, or by the name of the perfect insect described in full by Dr. Riley after its true nature had been found out.

In Murray's *Aptera*, without date but bound up with Official British Museum Advertisements dated October, 1876, and presumably issued in that year, this mite is treated of under the head of *Trombidium gryllarium*; but, in Mr. Samuel Henshaw's Bibliography of American Economic Entomology, 1890,—a most valuable and carefully prepared work, which will probably be accepted as authoritative by all Economic Entomologists — *Astoma gryllarium* is made to equal *Trombidium locustarum*, and it is, therefore, well for us to adopt the latter name and to drop altogether the name *Atoma* or *Astoma gryliarium*, referring to the stage found attached to locusts merely as the larval stage of *Trombidium locustarum*, Riley.

Besides those mentioned there are many other different kinds of parasites which infest locusts, but none perhaps which excite more surprise when their strange habits are explained than the curious creatures known as "hair snakes" or "hair worms," with their slender hair-like bodies from six to twelve inches in length tapering to each end and only at most one twenty-fifth of an inch through at their greatest diameter. These may be seen sometimes crawling on or coming out of the ground in large numbers after a shower of rain, sometimes along the edges of streams, either coiled and knotted up one or many together, or singly swimming close to the surface of the water with an undulating snake-like motion. Dr. Leidy, in his very valuable article on *Gordius* which appeared in the American Entomologist for 1870, when referring to the habit of these worms of coiling themselves in intricate masses, suggests that "similar knots no doubt were the source of the scientific name of the worm being applied to it by Linnæus from the fabled Gordian knot of antiquity. The *Gordius*, however, not only resembles the latter in the intricate condition into which it sometimes gets, but its history is yet in part a Gordian knot to be unravelled.'

These worms are not, by any means, unfamiliar objects in the country, and various misconceptions as to their sudden appearance in large numbers and as to their origin are widely prevalent. They are frequently sent for identification with the statement that they had fallen from the clouds in rain. The commonest error, however, is that they are horse hairs which, having fallen into water, have "come to life." It is not necessary here, of course, to point out the absurdity of this statement. "Such a transformation is an utter impossibility. No dead organic matter can thus be changed into a living creature. It is a law of nature that every animal being, from the lowest to the highest, has its commencement in an egg." (Lintner).

Several articles more or less complete have appeared on these worms. By far the fullest is the extended account in the First Report of the United States Entomological Commission, 1878, where probably nearly all that is at present known of their mysterious life history is collected together, and good illustrations are given. The hair worms,—of which there are several species, found parasitic in the bodies of insects of nearly all the different orders, such as the Orthoptera, Hymenoptera, Coleoptera, Lepidoptera and Diptera,— belong to the Entozoa or intestinal worms. They have a very remarkable cycle of development, which may be briefly summed up as follows: The eggs are laid in water, and the exceedingly minute young worms float about in a free state until they find the larvæ of some aquatic insects into the bodies of which they effect an entrance, as was observed by Dr. Meissner, a German scientist, through the delicate membrane at the joints of the legs. They then work their way gradually among the muscles and other organs throughout the body of their host and after a time become quiescent and encysted so as to resemble their former condition just before leaving the egg, and, as Dr. Meissner says, recall to mind the similarly encysted Trichinæ in the muscles of man and the hog. Mr. A. Villot added materially to our knowledge of these curious creatures and found that, when insects infested with these encysted larvæ were eaten by fish, the bladder-like cysts were dissolved by the process of digestion and the young worms set free in the intestines of their new host, at once bored by means of spines around the head into the mucous layer of the intestines of the fish, where they became again encysted. In the next stage, which

is not reached till spring, five or six months afterwards, they live a free-swimming aquatic life. To obtain their liberty, they first free themselves from their cysts in the lining of the intestines and pass into the intestinal cavity of the fish, whence they are carried out with the fæces into the water. Here remarkable changes take place. Mr. Villot says: "The numerous transverse folds of the body disappear and the worm becomes twice as long as before; its head armature disappears; the body becomes swollen, milky and pulpy. It remains immovable in the water for a variable period and then increases in size. The integument grows harder and when about two inches long the worm turns brown and begins to move."

At this point in the life history of these creatures all actual observation ceases, and it is only a matter of conjecture how these parasites can find their way into the bodies of such insects as locusts, tree crickets and beetles, many of which live preferably in dry places. It has been suggested that the worms can travel long distances on foliage and other surfaces when wet with rain or dew. It must be acknowledged that there is room for much careful investigation as to the habits of these useful allies of the farmer. What is well known, however, is that they are certainly parasites which occur frequently inside the bodies of many of our injurious locusts, and during the past season were so abundant in some places—as at Ottawa—that they could be found in varying numbers from one to five, generally two or three, in almost every large-bodied locust that was examined during the months of September and October.

With the dark-colored *Gordius* worms are usually found inside the same hosts some smaller and slenderer white specimens which are very similar in general appearance; they belong to another genus (*Mermis*) differing in many respects as to structure and some stages in their life histories, but equally useful with them from their habit of living as parasites inside and ultimately destroying locusts and grasshoppers as well as other insects.

In connection with grasshoppers mention must be made of the rather serious ravages of the Gray Blister beetles (*Macrobasis unicolor*, Kirby). fig. 56. These have been abundant in some localities during the past season and have infested fields of potatoes and beans; they were also troublesome on the Siberian Pea tree (*Caragana*), now grown considerably for hedges, also on the large-leaved and ornamental Aralias, *A. spinosa* and *A. Chinensis*. In the larval form these beetles are parasites in the egg pods of locusts, so that an abundant occurrence of blister beetles indicates that the armies of destructive grasshoppers are much smaller than they would have been but for this good feature in the habits of these otherwise injurious insects. The blister beetles generally appear suddenly and in large numbers, and if they are not attended to at once they quickly do much harm to a crop. Prompt spraying or dusting with Paris green are effective and where practicable great numbers may be beaten into pans containing water and coal oil. A long piece of Caragana hedge was saved in this way by giving it two beatings a day for a week in a locality where Paris green could not be obtained.

There have been other injuries to fodder crops: The Clover Root-borer (*Hylesinus trifolii*, Miller) occurred at one locality in the County of York, and the Clover-seed Midge (*Cecidomyia leguminicola*, Lintner) was rather more destructive than usual in the clover seed growing districts. Even in the eastern part of the Province its presence was clearly discernable by the appearance of the fields at the time of blooming. Reports vary as to the prevalence of the pea weevil, but, on the whole, while it seems to have been less injurious in the west, specimens have been found this year in pease grown as far east as Ottawa, which is a very rare occurrence.

Root Crops.—The root crops have been affected somewhat both by weather and insects. There has been mention of white grubs (*Lachnosterna*) Fig. 64, in potato and carrot fields, and, as mentioned above, grasshoppers and blister beetles have done their share of injury. The outbreak of most interest under this head was of the Clover Cut-worm (*Hamestra trifolii*, Esp.), which appeared during August in large numbers in the district lying around Rice Lake. The crops attacked were turnips, mangels and peas. The loss was greatest in pea fields, the leaves and even the fleshy tissues on the outside of the pods being entirely consumed. The caterpillars which vary very much in color and ornamentation first appeared about the first of August, and were in such numbers that they had to migrate

to obtain food, and for this reason were thought by some to be the army worm One correspondent wrote, "The green leaves and the vines themselves were eaten, but my peas were too nearly ripe before they were attacked to be much injured. I never before saw anything like it. The ground was literally alive with the crawling insects. We put

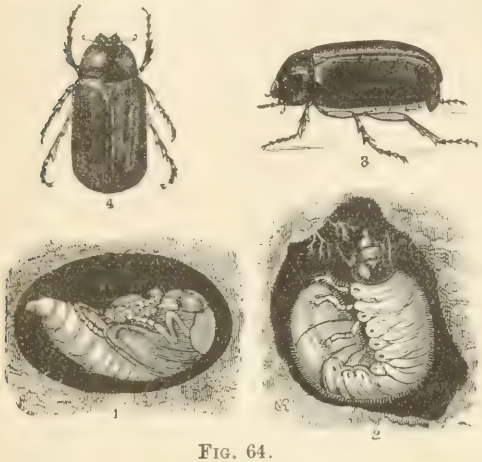


Fig. 64.

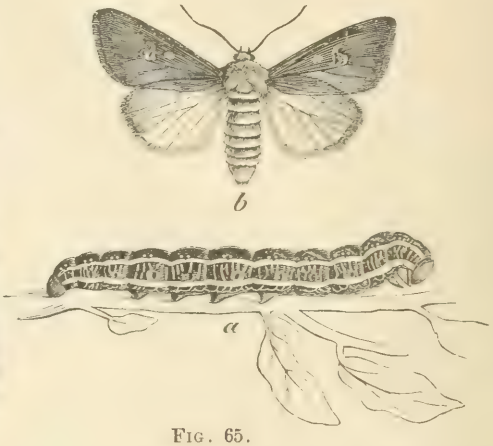


Fig. 65.

Paris green on the turnips, and this doubtless helped, but the insects were so numerous that one set after another took the place of those killed. Turnips near peas were injured most; they put forth a new set of leaves, but the growth of the roots was stunted, and they were only half a crop."

Turnips were also slightly injured by the Zebra caterpillar (*Mamestra picta*, Harris) which is a very general feeder, being found also on cabbages, potatoes, clover, celery, lucerne and many other plants. The caterpillar is a most showy insect (Fig. 65*a*); when full grown nearly two inches in length, velvety black on the back with the sides gaily ornamented with golden yellow lines connected by wavy white threads: the head and feet are chestnut red. When ready to transform the caterpillar spins a loose cocoon of silk with earth mixed with it and changes to a black chrysalis. The moth (Fig. 65*b*) has glossy brown upper wings and the lower ones are whitish. The eggs are laid in large clusters beneath leaves and seem to be, at Ottawa at any rate, much more infested with egg parasites than those of almost any other insect. In September, 1892, I found upon a plot of Bokhara clover (*Melilotus alba*, Lam.) hundreds of clusters of the eggs of this moth, which were so much parasitised by two minute hymenopterous insects, *Trichogramma pretiosa*, (Fig. 66), and a new species of *Telonomnus*, that not one per cent. of the eggs gave caterpillars. The only remedies which can be applied for the Zebra caterpillar are arsenical mixtures, and this species seems to be particularly resistent to the effects of all poisons so far experimented with. There are two broods in the year, the latter of which may be noticed on fine days long after the first severe frosts.

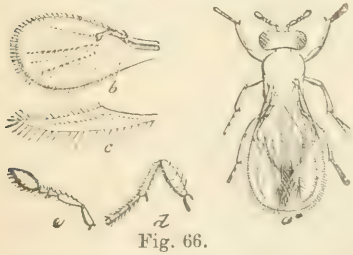


Fig. 66.

Vegetables.—In gardens the regular yearly pests such as cut worms, turnip flea, Colorado potato beetle, and the cabbage caterpillars have required attention. The species of cut-worm whose injuries have been most conspicuous, has again this year been the red-back cut-worm (*Carneades ochrogaster*, Gn.) This is a large and widely distributed species which feeds upon almost every kind of succulent vegetation. It was particularly destructive to newly set cabbages and tomatoes and to young beet root, as well as many annuals in the flower garden. Careful trial was made this year of the poisoned bran remedy, and good results were obtained. Bran or oat-meal was moistened with sugar in water sufficiently to allow of being ladled out with a spoon. Into this sufficient Paris green was

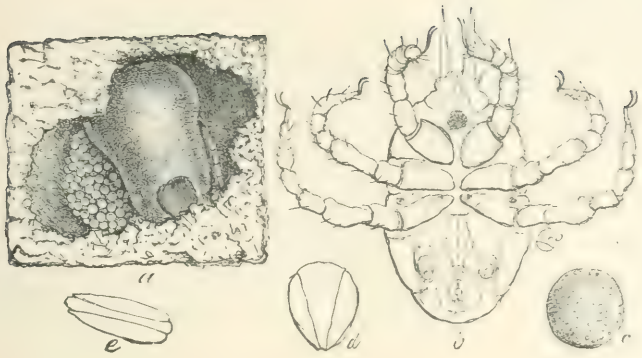


FIG. 62.—TROMBIDIUM LOCUSTARUM.—*a*, female with her batch of eggs; *b*, newly hatched larva—natural size indicated by the dot within the circle on the right; *c*, egg; *d*, *e*, vacated egg-shells (after Ri'ley).

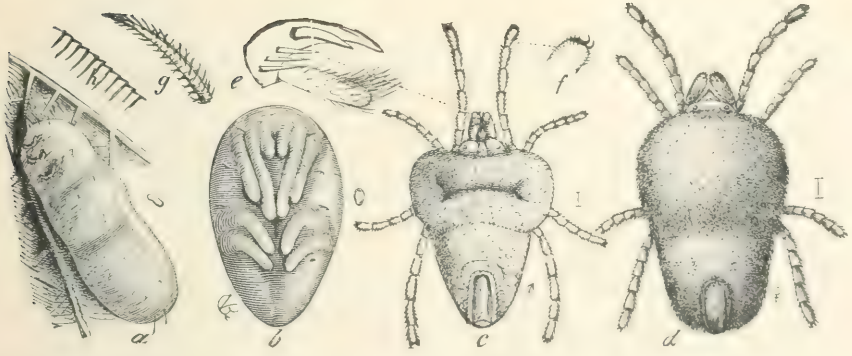


FIG. 63.—TROMBIDIUM LOCUSTARUM.—*a*, mature larva when about to leave the wing of a locust: *b*, pupa; *c*, male adult when just from the pupa; *d*, female—the natural sizes indicated to the right: *e*, palpal claw and thumb; *f*, pedal claws; *g*, one of the barbed hairs; *h*, the striations on the larval skin (after Riley).

(*See page 61.*)

Phelps Lake in Illinois, August, 1894. Dead Fish and Mussels. (After Forbes.)

Phelps Lake, August, 1895. After being brought under cultivation. Corn and Pumpkins. (After Forbes.)

(*See page 84.*)

stirred to give it a decidedly green tinge. A spoonful of this mixture was placed at intervals of six or eight feet along rows of peas, beets and carrots, which were being rapidly destroyed by these cut-worms. The results were most satisfactory, the poisoned bran was apparently so attractive to the caterpillars that only two or three plants were afterwards cut off and the bran was eaten instead, many caterpillars being found dead near the bran but some distance under the surface of the soil, where they required to be looked for with some care.

The "Black Army-worm" (*Noctua fennica*, Tausch) was abundant in the neighborhood of Picton, Ont., where it did much harm to peas and other garden plants, including raspberries and other small fruit.

Squashes and cucumbers have been much injured in western Ontario by the striped cucumber beetle (*Diabrotica vittata*, Fab.), and the true squash bug (*Anasa tristis*, De Geer) Fig. 67, was reported as very troublesome at Hamilton. When the plants are young and small, probably the best remedy is to cover the hills with a square of mosquito netting, or cheese cloth, supported by two or three sticks stuck in the ground and with the edges held down with a few handfuls of earth. When the plants get too large to be so confined, the insects may be kept away to a measure by sprinkling over the hills ashes or land plaster with which coal-oil has been mixed. Hand-picking for the Squash Bug must also be resorted to; for this purpose shingles are placed near the plants for the bugs to hide under.

Fig. 67.

Fruits.—Fruit insects in Ontario have been decidedly less noticed during the past season than for many years previous. This is probably due to the enormous crop which has been reaped; timely rains and fair weather for fruit crops seem to have prevailed over the whole Province. As in the past those who sprayed carefully, obtained paying returns. Although, on the whole, insect enemies have demanded less attention than usual, it is feared that carelessness in orchard management by which defective and infested fruit was left unpicked from the trees or to rot on the ground, may be followed next year by a large increase in the number of injurious insects which will in all probability infest a much smaller crop over the whole Province.

In western Ontario the second brood of the codling moth was particularly destructive. The work of the plum curculio, owing to the enormous crop of plums, was not so manifest as usual, but where looked for, could usually be found. In some districts where plums are not much grown, this is by far the worst enemy of the apple crop. The apple curculio (*Anthonomus quadrigibbus*, Say.) is not a very frequent enemy of the apple in Canada, seeming to confine its attacks more particularly to the fruit of the hawthorn. Two new attacks upon apples of considerable interest to fruit growers have to be recorded. The first of these by the caterpillar of a small moth which has not yet been bred to maturity, has affected to an appreciable degree the apple crop of certain localities in British Columbia, and what may possibly be the same insect has been found in a few instances at Ottawa and Montreal, but the injury to the fruit was much less serious than in the British Columbian apples, where the caterpillars burrowed in every direction through the flesh of the apple, causing it to decay and entirely destroying it for the market. The outside of the fruit was also gnarled with sunken depressions where the caterpillars had entered, and in many instances, this spot was marked with a white deposit similar to birds' droppings. This latter fact, however, is comparatively of small consequence, because the fruit bearing these deposits is already destroyed by the discolored burrows of the caterpillars which run in every direction through the fruit for which reason the name of "apple fruit-miner" is suggested. Judging from the nature of the injury to the apples this season, this is certainly a much more serious enemy than the larva of the codling moth, and the condition of an infested apple is much more nearly like that produced by the apple maggot (*Trypeta pomonella*, Walsh) for which indeed it was mistaken by some observers, but from which it is entirely distinct. The second attack new to this country, is by the true "Apple Maggot" which this year for the first time on record has infested cultivated apples in Canada in the orchard of Dr. D. Young, a careful observer of insect habits, living at Adolphustown, Ont.

At the end of October Dr. Young sent me some apples containing a few larvæ and showing undoubtedly the work of this injurious insect which he had never found in his orchard before this season. Three or four varieties only of apples were infested. It is important to notify fruit growers as soon as possible of the occurrence of this insect in our orchards as an apple pest and to give from the experience of growers in the New England States the measures which have been found most successful in fighting against it. The insect was first described by Walsh in his first report as State Entomologist of Illinois in 1868; but it had been known in the eastern states for several years before that, having attracted attention by its serious injuries to the cultivated apples in New York, Massachusetts, Connecticut and Vermont. Strange to say, although it has never, as far as I can learn, attacked cultivated apples in Canada until this year, it is common in collections of insects and occurs abundantly in the fruit of hawthorn in many localities. In 1887 I bred the fly from haws found at London, Hamilton, Toronto, Montreal and Ottawa. In 1888 the fruit of the hawthorn bushes on the Experimental Farm was so much infested by the maggot of this fly and the grub of the apple curculio that it was almost impossible to find a sound fruit. It is, however, by no means a singular habit for an insect to confine itself to a certain food plant in one locality when others are growing close to it, which elsewhere are preferred by the same species.

The most important articles on this subject have been written by Walsh (Ill. Rep. I.), Comstock (Rep U. S. Comm. Agric., 1881-2), and particularly Prof. Harvey, who wrote a long and complete account in the annual report of the Maine Agricultural Experiment Station for 1889, where the full life history of the species is for the first time detailed. The life of this insect may be said to be as follows: The perfect flies begin to emerge about the first of July and continue to appear until about the middle of September; eggs are laid at once, those first deposited producing the earliest flies the following season. The egg is forced through the skin of forming apples by means of the horny ovipositor of the females The maggots hatch and run tunnels all through the fruit of the apple leaving discolored brown tracks wherever they go. In this way the fruit is rendered quite unsaleable and ripens prematurely. The maggots are full grown in about five or six weeks, and as soon as the fruit falls they leave it and entering the ground a short way turn to puparia and in that condition pass the winter. Early and sub acid varieties of apples seem to be preferred, but late and winter varieties are also attacked. When the late varieties are infested, the maggots do not emerge until sometime during the winter after the fruit has been stored. In all Prof. Harvey's investigations he never saw an apple hanging on the tree from which the maggots had emerged. This is an important point because it shows the value of collecting all fallen fruit as soon as possible after it falls and destroying it so that the maggots may not leave and go into the ground to pupate. There are different ways by which this may be done. They may be collected by children and fed to stock, or, if there is no stock to eat them, they may be buried in a deep hole and afterwards covered up so that the flies may not be able to emerge the following season. Sheep or swine kept in the orchard from about the 15th July would save much labor by eating the fruit as soon as it fell to the ground, and poultry would render good service by devouring the fruit, maggots and puparia beneath the trees. The larvæ do not penetrate more than an inch or an inch and a half beneath the surface, so would easily be scratched out and found by chickens. Prof. Harvey draws attention to some important facts in the habits of the apple maggots. He points out that the perfect insects are rather sluggish and that the species does not seem to spread very rapidly in a new locality from orchard to orchard nor even from tree to tree in an orchard. He shows clearly, however, that it is a most serious pest from the way in which infested fruit is rendered quite useless for human food. The females are very prolific, each one laying from 300 to 400 eggs, and the young maggots hatching inside the apples are inaccessible to any wholesale method of treatment such as spraying. Up to the present no parasites have been detected feeding on the insect Almost all varieties of apples are liable to attack and as many as a dozen maggots have been found in a single fruit. Under remedies, he says, "The only chances are to destroy the larvæ and pupæ. The larvæ are found abundantly in windfalls, and the pupæ in bins and barrels where fruit has been stored. Destroying wind

falls would prevent the maggots going into the ground, and burning refuse from bins and barrels would dispose of those in stored fruit. These methods are practical, easily applied and should be rigidly enforced." "There is no lazy way to check this insect It will have to be done by a direct, squarely fought battle. We firmly believe we have in the careful destruction of the windfalls the means of destroying the pest."

The Cigar Case-bearer (*Coleophora Fletcherella*, Fernald) has been decidedly less abundant this season than for three or four years previously. Good results from spraying are reported by Mr. Harold Jones of Maitland, Ont., who noticed the young caterpillars moving on the bark on May 2 and at once sprayed with kerosene emulsion and practically cleared his orchard. Mr. W. H. Little, of Trenton, Ont., says it has been numerous in his orchard for about four years, but has kept it within control by spraying with Bordeaux mixture and Paris green. The insect is reported from Goderich and Port Hope in restricted localities. It was found at the latter place by Dr. Bethune in numbers upon an isolated apple tree against a fence, a long way from any orchard or garden. At Port Hope some specimens of a small parasite were bred from the cases by Mr. Wm. Metcalfe. These have been identified by Mr. W. H. Ashmead as *Microdus laticinctus*, Ash.

The Pear Slug (*Selandria cerasi*, Peck), this old enemy of the fruit grower, seems to have been unusually abundant during the past summer in all parts of the Dominion where prunus fruits are grown. Mr. L. A. Woolverton states that the second brood is more troublesome than the first and suggests that the reason is because at the time of the year when it appears, fruit growers are so busy picking and marketing fruit that it is almost impossible to find time to spray with Paris green.

After the exceptionally heavy crop of all fruits throughout the province this year, it is almost certain that the next season's crop will be light; the careful grower who attends to all such *little* matters as spraying will then most certainly reap a rich harvest at the expense of his less thoughtful neighbours. It is in the off years that the skill of the horticulturist is called forth; he cannot, it is true, always make his fruit trees set fruit and bear, but he can in many instances by skilful management materially improve the quality of his crop, and it is in years when the crop is small that he has the greatest latitude to show his superiority over the easy-going grower who trusts to luck and lets things come as they may.

FIG. 68.

Grapes have suffered somewhat from the Phylloxera. Mr. Woolverton found the leaf gall inhabiting form unusually abundant throughout the Grimsby district. In many cases hundreds of vines on a plantation had their foliage covered with the galls of the louse—Fig. 68. In the September number of the *Canadian Horticulturist* appeared a figure of a branch of a grape vine infected by Phylloxera. There are few insects as well known as the notorious *Phylloxera vastatrix*, Planchon, which has been the cause of such enormous losses to the grape growers of France, Italy, Spain, and other countries in Europe. This pernicious insect is a native of America, whence it was introduced into Europe and where it now commits terrible ravages, far exceeding anything that has ever been recorded here in its native country. The life-history was worked out by the late Dr. C. V. Riley and has appeared in several of our previous reports. There are two forms of this insect with very different habits. The first produces greenish red or yellow galls on the foliage, as shown in the illustration kindly lent by the editor of the *Canadian Horticulturist*; the other, which is the most injurious, attacks the roots, causing swellings on the young rootlets, which

finally decay and thus the root system of the vine is destroyed. The winter is passed in a dormant condition on the roots. In spring there are five or six generations of wingless females, all of which bear young without the intervention of males. In July some winged females are produced which leave the roots and fly to other vines, when each one lays a few eggs of two different sizes, from which are produced in about a fortnight perfect males and females. These are born for no other purpose than reproduction and are without means of flight or of taking food. Each female lays one egg, from which comes an egg-bearing, wingless female, thus beginning a new circle of existence. The winged females which are first seen in July continue to appear throughout the season and are most abundant in August.

Occasionally the underground form leaves the roots and produces galls on the leaves. These are more abundant in some seasons than in others, as during the past summer—but the Grape Phylloxera cannot from past experience be considered a serious pest in Canada, although at rare intervals there has been a loss of many vines in some vineyards which have been badly infested. The only remedy which has been adopted in this country has been the destruction of badly infested vines or the removal of gall-bearing leaves from those which are less severely attacked.

Another insect which has been locally troublesome on grape vines in western Ontario is the Grape Thrip (*Erythroneura vitis*, auct.). Mr. Woolverton thinks that it is increasing steadily year by year. It has been treated effectively by spraying vines carefully with kerosene emulsion before the young of the first brood acquire their wings.

The two broods of the Strawberry Leaf roller (*Phoxopteris comptana*, Frol.) Fig. 69 did considerable injury to strawberry beds around Picton, Prince Edward County, in June last and in the autumn. Luckily for Canadian growers of small fruits it is a rather rare occurence for this insect to be sufficiently abundant to attract notice, but in some of the northern United States it is considered the most destructive of the enemies of the strawberry grower. The caterpillars were found on the strawberry plants towards the end of June and were not noticed until they had injured one field of four acres sufficiently to give the plants the appearance of being attacked by a severe blight or as if fire had been over them. The caterpillars when full grown are about one-third of an inch long and vary in colour from yellowish-brown to dark-brown or green. They fold the leaves of the strawberry by drawing the upper surfaces together and fastening them with strands of silk. They then eat away all the green inner surface of the leaves, giving the beds a brown and seared appearance.

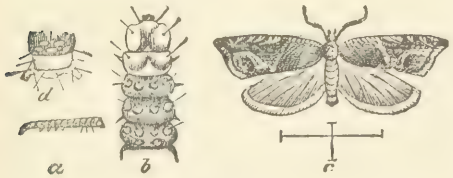

Fig. 69.

Mr. John Craig, of the Central Experimental Farm, who visited some of the Picton plantations on the 4th of July last, found that many of the caterpillars were full grown and ready to pupate; others, however, were small and would not turn to chrysalids for certainly a week or two later. Moths emerged at Ottawa from infested leaves sent from Picton between July 15 and 25, a period which would probably be extended at any rate till the end of the month in the fields. Eggs laid by this brood of moths produced caterpillars which again attacked strawberry beds severely at Picton in the autumn. As a remedy for this insect it has been recommended to mow off and burn the leaves of infested beds directly after the fruit is picked. The leaves containing the caterpillars or chrysalids, would soon dry up and would burn easily. That cutting off the leaves at this season can be done without injury to the plants has been proved by Mr. Craig in some experiments for controlling the strawberry rust. (See *Experimental Farm Report*, 1895, p. 113). It must be done of course before the moths begin to emerge. The second brood can be treated much more easily. When beds are known to have been infested by the spring brood, the plants must be sprayed or dusted with Paris green during August, so that the young caterpillars may be destroyed as soon as they hatch. Should the injuries be noticed only late in the season when the caterpillars are well grown, burning the foli

age may again be resorted to. The occurence of this insect at Picton was mentioned in the *Canadian Horticulturist* for July last in a letter by Mr. Craig and the remedy of burning the foliage recommended.

Red Spiders (*Tetranychus*, sp.) Fig 70, have been abundant and very destructive in many places particularly during the hot weather in August. There are doubtless many species of mites included under the general head "Red Spider." These minute plant-feeding mites are extremely difficult to control—when the weather is dry and hot. Frequent waterings with a hose where possible have a good effect, and sweet peas in several gardens at Ottawa were saved in this way. Dusting with sulphur also had a marked influence on the mites. Kerosene emulsion applied early to plants known to be infested was perhaps the most fatal remedy, but in large fruit gardens upon black currants and raspberries severe injury was done both by the mites and the frequent applications of the emulsion to the enfeebled foliage. As yet it must be acknowledged no practical remedy has been discovered for these pests when they are abundant and during hot, dry summers.

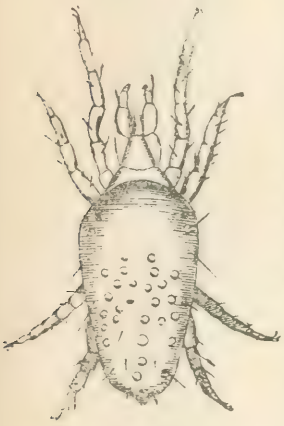

Fig. 70.

The Black Peach Aphis (*Aphis persicæ niger*, E. F. Smith), appeared last year for the first time in Essex County. This year there has been no complaint from that locality; but I fear that peach-growers from not recognizing the danger of this insect are failing to report its presence. Another occurrence was discovered near St. Catharines in a newly set peach orchard. The owner of the orchard, on having his attention drawn to it, promptly rooted up the trees and destroyed them.

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## SOME BEETLES OCCURRING UPON BEECH.

By W. Hague Harrington, F.R.C.S., Ottawa.

When so many of our forest, shade and orchard trees are defoliated and disfigured by an endless succession of insect pests it is satisfactory to find one of our most beautiful and valuable species comparatively free from such attacks. At the close of summer the stalwart, handsome beech will be found with its raiment of bright, glossy foliage almost as fresh and unspotted as in springtime, while its neighbours, the maples, elms, etc., are more or less naked and threadbare. Yet, favored as it is, there are several species of moths whose caterpillars find the tough leaves not unpalatable, such as *Hyperetis nyssaria*, A. & S., whose larva was described by Prof. Saunders in the Canadian Entomologist, vol. iii, p 209, and the pretty little casemaker, *Incurvaria acerifoliella*, Fitch, which at times so seriously infests the maples. (See Trans.-Ottawa Field Naturalists' Club, No. vi., p. 353.) The trunk when injured, or when the trees become weakened by age, is riddled by the boring larvæ of the large Horntail, *Tremex columba*, Linn, one of the most striking of our Hymenoptera, and becomes gradually the feeding ground of a variety of insects. The majority of the insects, however, which I have found infesting this tree belong to the order Coleoptera, and while but few of the species do serious injury to the tree when it is still vigorous, it may not be uninteresting to make a brief record of the species which have been noted by myself, or which have been recorded by Dr. Packard in his Forest Insects (Fifth Report of the United States Entomological Commission, pp. 513-520.)

TROGOSITIDÆ.

1. *Trogosita corticalis*, Melsh. An elongated, flattened, brownish beetle, about three-fifths of an inch long, with finely striated elytra, found under the bark of old trees; cannot be considered injurious.

2. *Grynocharis 4-lineata*, Melsh. A more flattened black beetle, about twice as wide as long, and very variable in size, from a little over two tenths to nearly four-tenths of an inch long. Each elytron has four raised lines, between each pair of which is a double row of punctures. This beetle is found under bark with preceding, and is also harmless.

ELATERIDÆ

3. *Corymbites cruciatus*, Linn. A handsome "click-beetle," whose larva is one of the wire worms which feed in decaying wood, and which has always been found by me on, or in the vicinity of, beech. It is about half an inch long, head black with the exception of the reddish mouth parts, thorax black with a bright red stripe down each side above and below, body beneath black margined with red, elytra yellow with sutural stripe, short humeral stripe and sinuate band behind middle, black. The black sutural stripe and the transverse band form the cross from which the name is derived.

BUPRESTIDÆ.

4. *Dicerca divaricata*, Say. A brownish or blackish bronzy beetle, of rather stout build, from three-quarters to almost an inch long. (Fig. 71.) It is a well known pest of such trees as the maple, apple, etc., its larvæ being one of the "flat-headed" borers, so-called because the thoracic segments (next the head) are much wider than those that follow. It is sometimes quite abundant on old trees, and in May and June can be found ovipositing therein. Some entomologists consider that the beech was the original food-plant of the insect.

F 71.

FIG. 72.

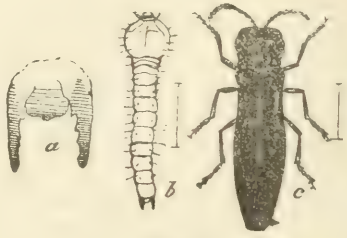


FIG. 73.

5. *Chrysobothris femorata*, Fab. This common borer of the apple tree (Fig. 72) has also been recorded (Riley, 7th Rept., p. 72) from beech, although of all the forest trees in this neighbourhood it seems to prefer the hickory. The oak, maple, mountain ash, linden and box elder are also said to be attacked by it. It is a flattened beetle, somewhat over half an inch long, of a metallic, bronzy colour with some greenish reflections, and the face of the male is bright green. It has been often mentioned in our Reports.

6. *Chrysobothris sexsignata*, Say. This beetle very closely resembles the preceding, but is slightly smaller, and is more rare with us. Mr. Chittenden records (Ent. Amer. V., p. 219) cutting a specimen from a beech tree. This beetle has also been found in yellow birch (Packard l. c., p. 485

7. *Agrilus bilineatus*, Web. This pretty little beetle is more elongated and in shape strongly resesembles the Red-necked Agrilus (*A. ruficollis*) (Fig. 73) which forms the gouty swellings on raspberry canes (Fig 74). It is about three-tenths of an inch long, and the upper surface is black, or greenish black, with a line of golden pubescence on each elytron, and on the margin of the thorax (these lines sometimes rubbed off or wanting); below the colour is coppery. I have taken it upon beech and believe it to infest this tree. Dr. Packard and Prof. Riley have each found it infesting oak.

Fig. 74.

8. *Agrilus interruptus*, Lec. This species much resembles the preceding, but is somewhat smaller and more slender. Its colour is more of a bronze, and instead of the line of pubescence it has a minute golden dot toward the tip of each elytron. I have found it upon beech, birch and hickory, but do not find in my books any records of the trees upon which other collectors have found it.

9. *Brachys æruginosa*, Gory. The larvæ of this little buprestid have been found by Mr. V. T. Chambers (Packard. l. c., p. 519) to mine in the leaves of the beech. The posterior segments are not so tapering as in the larvæ of the species previously mentioned. The beetle very closely resembles the following in size and appearance.

10. *Brachys aerosa*, Melsh. (*B. terminans*, Lap) is rather a common beetle with us, and is found most frequently upon the basswood, but also occurs upon elm, beech, etc, and may mine in the leaves of all these trees. It has been bred by Prof. Gillette from the leaves of poplar (Can. Ent., vol. xix., p. 138). The beetle is only about one-sixth of an inch long, of a sub-triangular or narrow shield-shaped figure; general colour coppery, the elytra purplish and ornamented with pubescence, which forms a band across the tips. We have a larger species, *B. ovata*, Web, which occurs upon oak.

### Cleridæ.

11. *Thanoclerus sanguineus*, Say. This little beetle is sometimes abundant under the bark, and quickly attracts attention by its bright red colour. It is one-fifth of an inch long and quite narrow; the head and thorax a duller red than the elytra and legs. It is very active in its movements, and when disturbed quickly hides in a crevice or the burrow of some borer. It is rather beneficial than injurious to the trees upon which it occurs, as it preys upon other insects.

### Ptinidæ.

12. *Eucrada humeralis*, Melsh. I have found this beetle under the bark of beech, and as most of the members of this family are destructive insects this may probably be classed as such. It is about one-fifth of an inch long, of brownish colour, with a reddish spot on each shoulder of the elytra which have several rows of punctures.

13. *Ptilinus ruficornis*, Say. This small cylindrical beetle which is very frequently found boring "pin-holes" in oak and maple, has also been found by me to do the same in old beech trees. The female is one-tenth of an inch long, brownish, with the head bent down under the globose thorax, the elytra faintly punctured. The male is only about half as large and is easily recognized by his prominent red antennæ (which give the species it name), the outer joints of which have long leaf-like projections.

LUCANIDÆ.

FIG. 75

14. *Platycerus quercus*, Web. This beetle and the two following belong to the stag-beetle family, in the males of which the mandibles, or jaws, are sometimes wonderfully developed. In this species they are as long as the head and turned up and irregularly toothed at the point (Fig. 75.) The beetle is about half an inch long, rather flattened, bronzy black in colour, shiny and feebly punctured. The female is lighter in colour, being nearly brown above; the legs and under surface reddish. The larvæ like those of the following species live in decaying wood of various trees.

15. *Platycerus depressus*. Lec. This species differs from the foregoing in being slightly larger, blacker and with the elytra more coarsely striate and punctured. The mandibles are shorter and stouter.

16 *Ceruchus piceus*, Web. This is a very common insect in old beech logs and stumps. It is much more stoutly built, and is very variable in size; from two-fifths to three-fifths of an inch long, the males being much larger than the females. The head is large, as wide as the thorax, and with a deep frontal depression. The jaws of the male are as long as the head, and with a strong inner tooth about the middle.

SCARABÆIDÆ.

17. *Dichelonycha elongata*, Fab.—A rather cylindrical beetle; four-tenths of an inch long; the general colour testaceous or yellowish; head flattened above; thorax more or less pubescent; wing covers with a greenish reflection, more pronounced in the males; under surface hoary, with scale-like hairs; tips of hinder legs sometimes blackish. This beetle and two or three closely allied species difficult to separate from it, feed in the perfect state, on a variety of trees. They much resemble in size and general appearance the Rose beetle, *Macrodactylus subspinosus*, Fab., which belongs to the same family but is, however, smaller and less corpulent. I have found them not infrequent on beech.

FIG. 76.

18. *Osmoderma scabra*, Beauv.—This is a large stout beetle (Fig. 76) of a dark bronze, or metallic brownish colour. Its length is nearly an inch, and it is about half as wide (across the elytra). The head is small, squarish and depressed above; the thorax rounded and irregularly punctured; the elytra irregularly wrinkled and striated. When alive this beetle diffuses a strong odour, which much resembles that given off by Russian leather. The larvæ feed in the decaying wood of old trees, and are fat white grubs much like those of the May-beetles. They construct large oblong cocoons from the particles of decayed wood, in which the grub pupates and finally becomes a beetle. It is probable that the closely allied species *O. eremicola*, Knoch., also breeds in old beech cavities.

SPONDYLIDÆ.

19. *Parandra brunnea*, Fab.—The shape of this beetle and its large mandibles give it a great resemblance to some members of the Lucanidæ (Stag-beetle family), but it is at once distinguished by having the antennæ straight and tapering to the tip, instead of terminating in a leafed club. It is variable in size, from five-tenths to eight-tenths of an inch in length, and of an almost uniform reddish or yellowish brown colour. The grubs live in the wood of stumps and old trunks of various trees, the beetles being found under the loose bark, although they are seldom numerous.

CERAMBYCIDÆ.

20 *Smodicum cucujiforme*, Say.—This beetle I have not seen, but it is one of the smaller species of the longicorns, being only three-tenths of an inch long. The following is part of the original description of the species: "Body depressed; head with a slight

rufous tinge, antennæ rather shorter than the body, tinged with rufous; thorax longer than broad, obtusely contracted each side, rather before the middle; elytra irregularly punctured, without elevated lines; thighs dilated." Mr. Schwarz records finding it under the bark of beech. (Packard l. c. p. 79).

21. *Dryobius sexfasciata*, Say.—Mr. C. G. Siewers records (Can. Ent. vol. XII., p. 139) finding five examples of this handsome beetle under the bark of beech. The grub is stated by Dr. Fitch to be much like that of the common elm-borer, *Saperda tridentata*, Oliv., but larger. The beetle is also of nearly similar form to that species, the length about three-quarters of an inch; colour black, and each elytron with four oblique yellow bands.

22. *Xylotrechus quadrimaculatus*, Hald.—This beetle much resembles in shape and colour a longicorn, *Neoclytus erythrocephalus*, Fab., which is often found on hickory. That species, however, is smaller, and has longer legs; the yellow markings are also different. *X. quadrimaculatus* is half an inch long, and of a reddish colour; head small; thorax globose with two bright yellow spots on front margin and less distinct markings on the hinder margin; elytra with somewhat yellowish tinge and faint oblique yellow lines; legs slender and pale reddish. The only specimen of this beetle which I have taken at Ottawa was found resting on the branch of a beech in June.

23. *Cyrtophorus verrucosus*, Oliv.—This is a common beetle, very ant like in appearance, which occurs upon various trees, and very frequently upon flowers, such as spiræa, goldenrods, etc. Mr. Chittenden has bred examples from beechwood. It varies considerably in size, but average examples are four-tenths of an inch in length. The head is small and sunken to the eyes in the thorax; the antennæ are nearly as long as the body and very slender, the third joint having a strong spine at the tip. Thorax rounded and humped above, very closely and finely sculptured. The elytra are angulated at the shoulders, and each has an elevation near the base, along which runs diagonally a narrow white line, behind which are two less oblique lines, the last being almost transverse. Sometimes the beetle is all black, with the exception of these white lines, and the partly reddish legs, but many specimens have the basal half of elytra (between the thorax and transverse white line) reddish, as also the corresponding under surface and the legs.

24. *Centrodera decolorata*, Harr.—This is a much larger longicorn of which I have taken one example on beech. It is about an inch long, of a chestnut red colour, except the elytra and abdomen, which have a more yellowish tinge. Head moderate in size, and narrowed behind the large, coarsely granulated eyes into a neck. Thorax small, narrowed in front and strongly angulated, or subspinose, in the middle. Elytra at base nearly twice as wide as thorax, and tapering very little toward the rounded tips; coarsely punctured at base, and more finely toward tips. Antennæ reaching to middle of elytra, dusky except basal joint. Legs moderately long and stout.

25. *Toxotus Schaumii*, Lec.—A very handsome longicorn of which one of my examples was taken on a small beech, in a beech grove, in July. It much resembles in size and shape the preceding species, but the thorax is less strongly angulated, and the elytra taper more. With the exception of a wide red band on all the thighs it is entirely black.

26. *Anthophilax attenuatus*, Hald.—One example of this rare longicorn was taken by me in an old beech log in May. It is in general shape much like the foregoing and about three-quarters of an inch long. Head and thorax black; antennæ and legs slender and reddish; elytra brownish and mottled with whitish pubescence.

27. *Leptura subhamata*, Rand.—An example of this pretty and variable species was also taken in an old beech log, and I have taken it likewise on oak. It averages about half an inch in length, and is of rather slender build. The head is small and narrowed to a neck; antennæ long and slender, the joints partly yellow at base. In the male the thorax is black, but in the female it may be either black with a yellowish side stripe, or yellowish with a black central stripe. The elytra of the male are black, with a yellow

stripe on each reaching from the shoulder to beyond the middle, and crossed by a black band so as to form a cross. In the female they may have the same pattern, only the yellowish stripes are larger, or the elytra may be yellowish with a narrow black rim and a band across the middle. Under surface of male, and most of legs, black; under surface of female and legs mostly yellowish.

28. *Goes pulverulentus*, Hald.—This beetle has been recorded by Dr. Horn as very destructive to living beech trees, in the larger branches of which it bores tunnels several inches in length. It may, therefore, be considered one of the most injurious insects infesting this tree, and, as I have previously recorded (Ann. Rept., xiv p. 48), there is little doubt that it also inhabits the hickory. It is a rather large beetle, and in shape closely resembling the female of the common pine-borer, *Monohammus confusor*, Kirby, the smaller specimens of which it equals in size. Length from three-quarters of an inch to about an inch; antennæ slender and slightly longer than body; thorax cylindrical, with a sharp spine on each side; elytra wider than thorax; legs moderately long and stout; colour brownish, but having a hoary appearance, especially beneath, from short white pubescence.

29. *Acanthoderes quadrigibbus*. Say.—This species has been recorded by Mr. Schwarz as boring in the dry twigs of beech and oak. It is a pretty little beetle, quite different in shape from the preceding. Its length is about three-fifths of an inch, and it is rather broad and flattened in proportion to its length; thorax tuberculate above; legs short; the thighs rather stout; elytra with mottled whitish and brownish pubescence and with a sinuate whitish band before the middle.

30. *Leptostylus macula*, Say.—This species which infests the butternut and chestnut has also been observed by Mr. Chittenden to inhabit the beech. I have found it upon butternut, maple and balm-of-gilead, but more frequently upon hickory. It does not differ very greatly in appearance from the preceding beetle, but is smaller and less tuberculate. Individuals vary in length from one fifth to three-eights of an inch, colour brownish; thorax with a white stripe on each side, bordered above by an interrupted brown line; legs banded with white and brown; elytra coarsely punctured and imaculate with brown spots, and banded with white behind the middle; antennæ long and slender.

31. *Hoplosia nubila*, Lec.—This species, according to Mr. Schwarz, also bores in the twigs of beech. It is longer and narrower than the preceding insect. Length three-eights to one-half of an inch; thorax with lateral spines; antennæ longer than body and slender; elytra longer and almost parallel sided, truncate at tips instead of rounded: colour brown, with mottling of whitish pubescence, giving a spotted appearance, and leaving irregular bands on the elytra.

### Rhipiphoridæ.

32. *Pelecotoma flavipes*, Melsh.—A small, slender beetle which on one occasion I found quite abundantly on an old beech tree. As the members of this family are parasitic in their habits, it may probably be considered as a beneficial species, preying perhaps, upon some of the inhabitants of the tree.

### Otiorhynchidæ.

33. *Pandeletegus hilaris*, Hbst.—This beetle belongs to a family of weevils, or snout-beetles, which contains some well-known injurious insects. Harris records it as boring in oak, and occurring on all trees from May to September; while Mr. Chittenden notes it as common upon the beech. I have not found it at Ottawa yet, but have received specimens from Mr. Johnston, of Hamilton. It is quite small, being only from one-eighth to one-fifth of an inch long; colour pale-brown, with some greyish and black stripes; beak short and broad; thorax coarsely granulose; elytra with rows of deep punctures.

CURCULIONIDÆ

34 *Ithycerus noveboracensis*, Forst.—This species is the largest representative of the family which occurs with us. It has been found at times a serious pest in orchards, injuring apple, peach, pear, plum and cherry (see Insects Injurious to Fruits, Saunders, p. 196). According to Riley it infests the oak, in the twigs of which the larva tunnels. With us it seems to inhabit the beech, upon which I have frequently taken it, in the month of June. At Chelsea, a few miles from this city, it was very abundant one season, individuals being observed on every tree examined in a grove of beech. It may be readily recognized among our snout-beetles by it greater size, being five-eighths of an inch long, and robust. Beak, broad and stout with a ridge down the centre; thorax cylindrical, a little narrowed in front; elytra twice as wide as thorax, and declivous or pinched in at the apex to fit the corpulent body; colour greyish; the thorax with three indistinct pale stripes, and each elytron also with three whitish lines, interrupted with black spots, lower surface and legs whitish. Fig. 77.

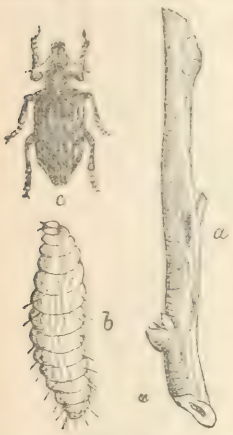

Fig. 77.

35. *Cryptorhynchus bisignatus*, Say.—A pretty little brownish weevil, with an oblique white dash on each elytron, much resembling in shape the Plum Curculio but smaller and not tuberculated. Mr. Chittenden has found it upon both oak and beech trees and believes that it lives under the bark of these trees.

36. *Acoptus suturalis*, Lec.—Mr. Chittenden has taken specimens of this beetle from beech wood. It has been recorded by me (Ann. Rept. xiv., p 50) as boring in hickory, and the following description was there given of it. A small, black beetle (length one-eighth of an inch), densely clothed beneath and more sparsely above with short yellowish hairs. The elytra are striated and in unrubbed specimens have a wide band of yellowish pubescence across the base, and a narrow one near the tips, which are black, as is also the space between the bands; a white line along the suture interrupts the basal band.

CALANDRIDÆ

37. *Phlœophagus apionoides*, Horn.—This is a very small and narrow blackish weevil about an eighth of an inch long, with punctured thorax and striated elytra, which Mr. Chittenden found to occur upon the beech with the species just mentioned, and which he believes to breed in the wood likewise.

38. *Phlœophagus minor*, Horn.—As its name indicates this species is smaller than the preceding, but otherwise closely resembles it, except in being of a paler colour, a reddish brown. Mr. Chittenden states that it breeds in the beech and also occurs on the elm.

38. *Stenoscelis brevis*.—This species which is stated to breed in the wood of beech has been found by me also infesting oak, hickory, maple and poplar. It is a black cylindrical beetle, one-eighth of an inch long, with faintly punctured thorax and striated elytra; beak short and smooth, giving it much the appearance of some of the bark-borers which belong to the next family.

SCOLITIDÆ.

39. *Monarthrum fasciatum*, Say. This little species bores in the living tree in the same manner as the Apple Bark-borer (*M. mali*, Fitch) which infests the apple, and which it much resembles.

40. *Xyleborus obesus*, Lec.—This is also a small insect which bores in the living tree, and which much resembles a destructive species (*X. pyri*, Peck) which attacks the pear and which has been named the Pear Blight Beetle.

## NOTES ON THE SEASON OF 1896.

By J. Alston Moffat, London, Ontario.

The season commenced early and gave promise of being a good one for the collector, but soon showed symptoms of failing to fulfil its promise. The conditions here were unusually favorable for the production of luxuriant vegetation, and might have been considered equally so for the maturing of insect life, and yet the season was marked by a noticeable absence of that profusion usually seen in the early part of the summer particularly. And this seemed to be the experience of all the regular collectors I met with. When asked as to their success, the unvarying reply was, "There is nothing to be got." And yet, on the other hand, Mr. Bryce, an electric light trimmer, made during the season a large and varied collection of moths; not damaged ones taken out of lamps, but fresh specimens in good order, taken mostly at rest in the vicinity of the lights. When looking at that collection one felt like saying that there could have been no scarcity of good material, but it only proved the value of electric light as a means of concentrating them at particular places for observation, and also, that insects have to be somewhat abundant to become conspicuous. The only moths that attracted my attention about the lights were species of *Crambidæ*.

The climatic conditions in the southern portion of Ontario were remarkably diverse within short distances, the western section having a superabundance of moisture, whilst the eastern section was proportionately dry, vegetation of all kinds there suffering severely from want of rain; yet there were two injurious insects that seemed to prosper equally well under either condition, namely, the Colorado potato beetle and the imported cabbage butterfly, both being unusually plentiful.

The newspapers reported grasshoppers as causing considerable damage in specified localities, but within the range of personal observation, they were noticeable mostly for their absence. Even in the dryest localities visited by me they could not be called abundant.

As was to be expected, after such a superabundant overflow of *Hadena arctica* last season, the next would be one of corresponding scarcity of the same species, and so it proved to be. Three specimens of it came under my observation, and three only. Many writers have a fondness for giving columns of figures that are perfectly appalling, illustrative of the natural cumulative increase of insects in a given number of generations, and the unsuspecting reader taking that as the unvarying rule in nature, reasonably concludes that it any species is particularly plentiful one season, it must necessarily be much more so in the following one, and consequently anticipates its advent with more or less alarm; but nature, which is full of surprises, has an easy method of confusing arithmetical calculations, or even of running counter to them. Long continued observation has led to the conclusion that the rule in nature is rather that an unusual outbreak of an insect in one year will be followed by a more than usual scarcity of the same species the next.

Two things are necessary for an abundance of any insect form. First, plenty of eggs; second, favorable conditions for the maturing of the same, in which must be placed an absence of living foes. A noticeable outbreak of a destructive insect is not necessarily preceded by an unusual number of producers. If all the eggs of any species of insect in any year were to come to maturity, there would undoubtedly be a noticeable increase of that species. But as a rule, it is a very small percentage of the ova of any insect that reaches maturity, many natural causes combining to reduce their numbers all along the line of their advance towards that consummation, and thus the balance is maintained between contending interests. This is what is known in scientific phraseology as "the struggle for existence," a delightfully brief but vague expression that covers much ground but explains nothing.

It would be a great satisfaction to be able to give a direct answer to the question so frequently put as to the cause of the abundance or scarcity of some insects at particular

times, but with creatures that work so much in secret as insects do, it is probable that it can never be done. When an unusual outbreak of any injurious insect occurs we can say positively that the conditions for its coming to maturity had been particularly favorable, but that includes all the climatic conditions, whether these were wet or dry, cold or hot, steady or fluctuating, and as these influence different species in different ways, the uncertainty is the greater; then there is food supply in the past as well as the present; the absence of predacious enemies, parasitic fungi and such like; they may also cover the character of the cultivation of that locality, as that may form a harbor and encouragement to the increase of pests,—an extent of varied knowledge which no one is likely to be in a position to possess. And so with their absence or great scarcity in other years, we can say positively that the conditions were not favorable, but just what these were it may be impossible to specify, especially by one who was not in the locality and had no opportunity of observing the conditions.

The first really serious and wide-spread outbreak of the army-worm, *Leucania unipuncta*, Haworth, in Canada, having occurred the last season, was the means of directing general attention to that destructive insect; and was productive of much newspaper correspondence. I had an opportunity of seeing the worm in the flesh, for the first time to my knowledge, and inspecting its work; and this is how it was obtained:

Being on a visit to Hamilton in July, I was invited to spend the evening of the 22nd, at Boulderwood, the charming summer residence of Mr. and Mrs. B. E. Charlton. It is situated on the brow of the mountain, adjoining the north or city side of the asylum grounds. On our way up, Mr. Charlton informed me that the army worm had invaded the asylum grounds, and was destroying the crops; and he proposed that after dinner we should visit the locality, and survey the invading army; which we accordingly did. We obtained the guidance of the farmer of the grounds, who led us to the infested field, which was at the extreme southern end of the asylum farm. He said they were first noticed in a field of oats, and on the other, or southern side of the road from his, and that the owner as soon as he knew they were there, cut his oats and shocked them in the field. The next day when he examined his shocks he found the ground under them a mass of worms intermingled with oats. The asylum farmer at once ordered his to be cut, but had them carted to a far distant field and there put up in shocks.

The crop next north of the oats that had been cut and removed, was spring wheat. There we had evidence of what the worms could do. Not a loose leaf was to be seen in the field; the straw standing quite naked. It had begun to ripen, which probably had saved it and the heads from attack, as some of the short and greener ones showed signs of having been nibbled at. We found a number of the worms under clods, but the farmer expressed surprise at their being so scarce, as compared with the previous day, when a pint or more of them had been taken in a very short time, which had been wanted for exhibition purposes. Probably the bulk of them had gone to seek fresh pasture, as there was not a green leaf in that field left for them to eat. Some of those taken seemed to be full grown, and may have been preparing to pupate, as chrysalids were found. During the search Mr. Charlton found a creature which was to us of doubtful parentage. I thought I recognized it as something I ought to know, but could not say what at the time. Having surveyed the situation to our satisfaction; and Mr. Charlton having secured three of the largest worms in a box, the unnameable creature and a chrysalid; we returned to his residence. After these had been looked at by the residents and visitors assembled, the time came when I had to leave; Mr. Charlton kindly said I might take the box and its contents, which I was very pleased to do; so I put it in my vest pocket, which it just fitted. Upon reaching my place of abode, I took out the box to show my friends the army worms; when I opened it, I found the largest one had disappeared, except the head and shrivelled skin, which was about the size of a grain of wheat, whilst the unnameable creature had another one by the middle, and was quietly engaged in absorbing its internal economy with unmistakable satisfaction. This disclosure of its habits at once suggested to me that it was the larva of some predaceous beetle, probably an *Harpalus*, and that I had seen an illustration of it somewhere. Upon

returning to London and making search, I found its exact counterpart on an enlarged scale in "Saunders's Insects Injurious to Fruit," page 185, which is here reproduced, Fig. 78.

During the next day, the *Harpalus* larva rested quietly, two worms seemingly being enough to satisfy its cravings for one day; whilst the remaining worm was very restless, no doubt from want of food. In the evening, being in company the army worm was introduced in the conversation, when I remembered that I had the box in my pocket, I took it out to show the worm, but there was not the vestige of a worm left, and the *Harpalus* larva was rushing frantically round in the box in search of more. I kept it that night to see if it would attack the chrysalid, but it did not, so I gave it its liberty next morning in consideration of the good it might do.

Fig. 78.

A great deal of romance has been written upon the army worm. Its sudden appearance in vast and destructive hordes is well calculated to arouse the imagination of those who are usually totally indifferent to, and wholly ignorant of the habits of insects; consequently the movements of the army are to them perfectly mysterious. We read of their coming, no one knows how, or from where, of their always travelling to one particular point of the compass. Of their following a leader who directs their movements; and who gives the signal for their advance by a wag of his head; and much more of the same sort. The army worms come from eggs, like all other insects, which in this case are laid near the roots of grasses by the moth *Leucania unipuncta*; and may be feeding there in great numbers when young, without attracting the slightest attention. It is not until they are well grown that they acquire their great powers of destruction, and then the field in which they were born may not be able to sustain all of them; when the necessity to travel to other localities in search of food is forced upon them. The only really mysterious thing about their movements is, that they should keep together in a body, and go in the same direction in search of food, instead of, as is usual with caterpillars, each going in the direction that its fancy leads, independently of the others of its kind. This gregarious habit is indeed very wonderful. But food is their objective point of travel, not any particular one of the compass.

There is another destructive insect that is endowed with this peculiar habit of travelling all together in one direction in search of food, namely, the migratory locust in its mature state; and a consideration of its mode of progress in desolating a region, may assist us in forming an idea concerning that of the army worm. When we read of an invasion of locusts into a locality where there were none before, they are always represented to us as coming down from the air above, ravenously hungry, as if it had been their first stopping place for food on a long journey, a few at first, then a dense mass, sufficient at times to obscure the light of the sun, gradually becoming thinner, then passing over, not leaving any living green thing behind them. This appearance, although it may be misunderstood by the onlooker, is nevertheless quite in harmony with the actual facts of their progression. Supposing a field well stocked with locusts who have just developed mature wings and a prodigious appetite, find their food supply exhausted, and it has become needful for them to go elsewhere for more. The field next to them is untouched, those close to it enter, those behind them follow, whilst those at a distance who are as eager for food and in as great a hurry to obtain it, rise on the wing and fly over the feeders and alight just beyond them, their peculiar gregarious instinct compelling them to feed in crowds, so that those that entered the fresh field first, find themselves surrounded by a multitude which has devoured everything before they get enough; hence they in turn find it necessary to rise on the wing and make for the front again to obtain more and so having started they proceed; and the deeper and denser the advancing host, the further they have to fly to reach the front, and the more of them there are on the wing at one time, the higher some of them have to rise in the air to get over the others; and when we read of their coming down in such numbers and such

force, as to remind the beholder of a hailstorm, and make him glad to seek shelter from their contact, it is in perfect accord with their mode of progress and their eager haste to obtain food; and this mass, to a beholder who could take it all in at once, would appear like a huge rolling crowd of living particles, descending in front but ascending at the rear, whilst the impelling force that keeps it going is the necessity for something to eat. And when we consider the meagreness of the supply in some localities, compared with the enormousness of the demand that always exists, we get the reason for the differences of time that they take on the way. If food is abundant, they linger; if it is scarce they pass rapidly on. When we turn our attention again to the army worm, we see that the principle and the motive are the same in both; but the one proceeds on the wing, through the air, whilst the other has to keep on the ground and go afoot; yet the front ranks will be constantly changing places with the rear, for as those in front stay to eat, those behind have to pass beyond them to obtain a share; and as the feeders are so numerous in one place, none of them get all they want, so they are compelled to move on to get some more; which completely disposes of the "leadership" theory.

Amongst the captures here of rare forms during the past season, I may mention a specimen of *Papilio Marcellus* by one person, and one of *P. Philenor* by another. *P. Cresphontes* again paid us a visit, after an absence of two years. It appears as if this southern butterfly must be either periodical in its habits, or has not yet succeeded in firmly establishing itself in more northerly localities; and is depending upon additional migrations to maintain an appearance. In the year 1893 it was more abundant, and reported from a greater number of localities, and some of these further north than ever before. In 1894 I saw a few in the early part of the season, but none later on. In 1895 I did not see a single specimen on the wing, nor was there one reported to me as having been seen. In the latter part of August, 1896, I saw a fine fresh specimen, but did not secure it, I also saw one that was taken later in the season in a damaged condition; which would seem to give promise of its being more plentiful again next year.

A specimen of *Erebus odora* was taken by Mr. Kyle, at Dundas.

The things new to this locality, recognized in Mr. Bryce's collection, were the true Carolina Sphinx, as distinguished from *quinquemaculata*. Large in size, dark in colour, and in fine condition. *Cisthene unifascia*, Grote, bright and fresh. Mr. Bryce has kindly donated a specimen of each to the Society's collection. He has also taken a single specimen of *Aspila virescens*, Hub. Also many choice varieties of less rare things, as well as several species not yet determined. Never did I see the webs of *Hyphantria cunea*, the fall web worm, so offensively obtrusive as during the past season.

In the early part of October the males of *Hybernia tiliaria*, Fig. 79, the Lime-tree Winter Moth, were in great profusion around the city. They could be seen even on frosty nights, fluttering about the lighted shop windows, and in daytime resting in sheltered places, or being driven along the street by the wind; their large sail-like wings affording ample space for catching every breeze, and being carried helplessly away by it. There was a wonderful, and particularly interesting diversity in the shade and pattern of the colour and ornamentation of their wings, which their abundance gave one a good opportunity to observe. The females I did not see; as these are wingless they would require to be sought for upon the trees.

Fig. 79.

# WARNING COLORS, PROTECTIVE MIMICRY AND PROTECTIVE COLORATION.*

By F. M. Webster, Wooster, Ohio.

In "Memoires de la Societe Zoologique de France," Professor Felix Plateau has recently given the results of some experiments carried on by himself, to determine whether, as has often been stated, the Magpie moth is really an example of what is termed "warning color." In order to solve the problem, the Professor ate several of the caterpillars, and found them to possess something of the flavor of almonds, and not unpleasant to him, but rather the reverse. Unfortunately, this experiment only proves that as against a person to whom the flavor of almonds is not distasteful, the larvæ of the Magpie moth are not warningly colored, but the real question regarding protective coloration, as against bird enemies, does not appear to be nearer a solution than it was before. Men do not feed upon the larvæ of this moth, or the moth itself, nor have we good reasons to suspect that they have ever done so, and there is no reason why these caterpillars should be, to them, distasteful, as no material protection would in any case result. The two following incidents will illustrate my point.

Species belonging to the genus Danais are, rarely, if ever, to any extent attacked by birds, and in the tropics even monkeys are said to reject them. In the United States, *Danais archippus*, (see Fig. 27, page 31), is mimicked by *Limenitis disippus*, (Fig. 80), and in other parts of the world other species of the former genus are mimicked by still other species of butterflies, some very interesting illustrations being given by Mr. Roland Trimen in his paper on "Some Remarkable Mimetic Analogies among South African Butterflies."† In the United States, *D. archippus* breeds in the north, and in autumn migrates in immense swarms to the south, where it hibernates through the winter. In "Insect Life," it is stated‡ that these butterflies are sometimes attacked in their winter quarters, and great numbers of them eaten, by a mouse belonging to the genus *Onychomys*; one of the grasshopper and scorpion mice. On an island in Aransas Bay, on the gulf coast of Texas, the remains of at least twenty-seven individuals were found in one place by Mr. Attwater, thus showing that the species is not distasteful to this mouse, but by no mean disproving that to other animals, and to birds, it is distasteful, and for this reason mimicked by other species of butterflies. This mouse is not a persistent and perpetual enemy, and unrestrained does not threaten the extermination of the species, and protection from it has never become necessary, and is not now essential. The Harlequin cabbage bug, *Murgantia histrionica*, (Fig. 81), is a conspicuously colored, tropical species, that has made its way northward as far as Lat. 40° 48′, even the egg being white banded with black. Not only does the species feed during its entire life, in all stages of development, in the most exposed positions, but the eggs are placed in clusters equally exposed, every habit, in fact, indicating a total disregard of the presence of natural enemies of any description, thereby implying, though not proving that it is distasteful if not warningly colored. Some time since I had

Fig. 80.

Fig. 81.

*Read before Section F, Zoology, of the American Association for the Advancement of Science, at the Buffalo, N.Y., meeting, August 25th, 1896.

†Linn. Soc. Trans. Vol. XXVI., pp. 497, *et seq.*

‡Vol. V., p. 270.

occasion to confine a number of these bugs in a greenhouse upon cabbage plants over which a breeding cage without a bottom was placed, earth being banked up about the base of the cage. The bugs had been thus confined for a short time when during the night, mice worked their way under the side of the cage, and in the morning all that remained of the bugs consisted of a confused lot of heads, legs and fore wings, the mice having clearly eaten the confined bugs during a single night. Still, as against persistent and continual enemies these bugs may be and probably are distasteful, mice being only occasional or accidental enemies.

In commenting on the experiments of Professor Plateau, 'Science Gossip," perhaps somewhat overestimating the value of the results obtained, says:—"It would indeed be well if all the examples of 'warning coloration' were subjected to as careful an examination. Equally cautious also should naturalists be before accepting examples of 'mimicry' among animals and plants. In some cases the so-called 'advantageous mimicry' falls to the ground, for the insect which is supposed to imitate one of its fellows appears at quite a different time of year from it."

Now, caution is a grand virtue, and should be, always, the investigators watchword, but to be over cautious is to cheat ourselves and each other out of the truth, which practically amounts to little less than carelessness. He who cautiously winnows the grain, will be as careful that none is blown over with the chaff as he will be to keep the latter from falling back into the cleaned grain, as, in either case, his work will be but poorly done.

By the way, has it ever been settled, beyond question, that both the species protected and the one protecting must occur, interspersed together, over the same area, and at the same time of year? Would either the ornithologist or entomologist be greatly upset if he were to find that birds which had learned, by experience, in spring and while yet very young, to shun insects of certain peculiarities of colour and movement, or which appear to them to possess such characteristics, should continue to follow the same course in late summer or autumn? How soon do birds forget past experiences, and cease to profit by them? After having learned that certain insects, having certain peculiarities of color or of action are not fitted for food, will they not rather continue to profit by such experience, and avoid such at whatever time of year and wherever they encountered them? Besides, does all of this education have to be acquired by experience, or does heredity not exert an influence more or less important?

The adult of the Hickory tree-borer, *Cyllene pictus*, develops chiefly in *Carya*, and emerges in spring, being almost exactly reproduced, so far as form and colour are concerned, in the Locust tree-borer, *Cyllene robiniæ*, which develops in *Robinia pseudacacia*, and emerges in late summer. Both of these species are supposed to mimic wasps, but we will suppose that both wasps and borer have disappeared before the latter species of borer has emerged; would it not gain some protection from its close resemblence to the borer that had preceded it, several months earlier? Would entomologists be very much astounded if such conditions should be found to obtain among other species?

Adults of our *Podosesia syringæ*, resemble, very closely, both of our common species of Polistes, *P. annularis* and *P. metricus*, especially on the wing, and when at rest the abdomen of the moth is bent downward posteriorly and kept in constant motion, precisely as with the Polistes. If the moth is on the ground it does not readily take flight, or, like many other moths remain quiet, but moves about in precisely the same manner as the wasps. In this case a defenceless moth is not only, in all probability, protectively colored, thereby resembling an entirely different insect, armed with a formidable weapon of defence, but its movements are equally like those of the armed species, so that it must gain protection thereby, to greater or less degree. But if one were to hunt for *Polistes*, he would hardly select for his collecting ground a lilac bush long since out of bloom. He would be far more likely to search for them on flowers, where he would seldom if ever find *Podosesia*.

Do we not here have grounds for doubting the necessity for the mimicking and mimicked forms occurring together over the same area, and if so, how far may they not

be separated, and the former gain more or less protection from its enemies? Is it not more probable that birds and other natural enemies will avoid species having a close resemblance to armed or distasteful species, during their entire life, and wherever they may go? Will not birds that have hatched and reached maturity in the north, and there learned to avoid armed or inedible species of insects, or such as closely resemble them continue to follow the same policy respecting the latter, after they have migrated far to the southward, and may not the recollections of *Polistes annularis* offer protection to species resembling it, like the *Podosesia syringæ*, for instance, far beyond the geographical distribution of the former species itself? Unless birds are continually forgetting and having to relearn past lessons, we must certainly admit that protective mimicry and protective coloration may be in effect, over the entire area of distribution of the species deceived, even though this extend far beyond the area occupied by either the mimicking or mimicked species, though, as a matter of course, this influence must decrease as the deceived species are displaced by those new and untried. It would certainly seem that we might here find a solution of some of the very many perplexing problems of form, movements and coloration, that are constantly confronting the student of animal life.

That at least birds and animals do not readily forget old habits and former experience, especially if the lesson has been emphasized by pain, I will give two illustrations, one borrowed, the other my own, and doubtless many others will readily occur to anyone who will take the trouble to recall them.

In his exceptionally valuable work, "The Naturalist in La Plata," all the more valuable because of the author studying life in living forms, and speaking only of what he observed, Mr. W. H. Hudson, informs us that in that treeless country some species of woodpeckers have, through necessity, acquired the habit of seeking their food on the ground, and even nesting in the banks of streams, yet where this change of enviroment and consequent alterations in their way of living, have, in some cases, resulted in structural modifications, thereby showing their antiquity, they still retain their primitive habit of clinging, vertically, to the trunks of trees (presumably introduced) though the habit has long since lost its use. We thus have evidence, not only of the permanency of established food habits, but that habits of this sort are transmitted through long periods of time through the influence of heredity.

Years ago, when sparsely settled and therefore in a nearly primitive condition, the prairies of Illinois, where the greater part of my childhood was passed, were inha snakes of various species. My father owned a pair of oxen, one of which had, when a calf, been bitten by a snake; an experience that he never forgot. So long as he was retained on the farm, he could seemingly not only detect the presence of these reptiles by sight, but if out of sight and near at hand he appeared to scent them as unerringly; and once he detected the presence of a snake, of any kind or dimensions, he would give a snort and with a deep bellow break for home, whether attached to plow, harrow or waggon. On one occasion, with my father, I was crossing a track of prairie in early spring. The dry grass of the previous year had been burned and the ashes had disappeared, leaving the surface bare and brown, as the young grass had not yet put forth. I, at the time a very small lad, was in the waggon, while my father walked along beside the oxen. Suddenly "Old Star" gave a snort, and with a bellow that seemed to frighten his mate also, started off on a mad run, taking a bee line for home, not stopping until their stable had been reached. After assuring himself of my safety, my father returned to the place where the oxen had started on their wild run, and near by found a group of snakes that he had not before observed, belonging to a harmless species, collected in a confused mass, as is their habit at this season, enjoying the warm rays of the early spring sun. It does not seem probable that the sting of an insect would have a less lasting effect on a smaller animal or bird, or the recollections of a particularly distasteful morsel in the mouth soon become extinct, and besides, my father's ox would probably not have acted differently, or any sooner forgotten the pain of the snake bite received on the prairies of Illinois, had he been transferred to New England or California.

Along the south shore of Lake Erie I find two species of Hemiptera,* *Salda ligata*, Say, and *S. interstitialis*, Say, the latter and smaller, when skipping nimbly about, as Mr. Say stated that it did on the shores of the Missouri River, have a deceptive resemblance to so many stranded *Hydrophorus*, which I believe prefers such places to sandy beaches; and along Lake Erie at least they are far outnumbered by this species of *Salda*, which so closely resembles them. *Salda ligata* is larger and does not resemble any of the aquatic beetles found along the lake, but simulates to a remarkable degree some of the species of *Bembidium*, though at the time of my observation it was impossible to find a single representative of this genus in that immediate locality, whereas, they were most surely to have been found along the shores of almost any stream. Now, these two species of Hemiptera not only closely resemble species of beetles not present, but inhabiting quite similar places elsewhere, but also the movements of one species of Hemiptera add much more to this deception than does its color, thus raising the question as to whether these peculiarities of color and movement are mere coincidences, and of no service to the possessors, or whether they do receive benefit from such simulations by taking advantage of the lessons learned by the sand piper, or other birds of similar habits, along the shores of some distant inland stream, and which lessons caused them to shun insects having these peculiarities of form, movement and color. Is the investigator justified in casting aside the whole problem, because he does not happen to look far enough to see all of the factors entering into it?

On the extreme tips of the new growth of pine, a tree not indigenous in the locality where these observations were made, I find during June and July, a *Capsid*, *Pilophorus amœnus*,† which while at rest has much the appearance of some species of the Coleopterous family, *Cerambycidæ*, no species, however, being at all common on this tree, in this locality, though *Euderces pini*, is said to occur elsewhere on the pine. While moving about among the pine needles, however, the Pilophorus has almost exactly the quick, active, erratic movements of ants which frequent the same situations in considerable numbers, the Capsid, except when at rest, being almost indistinguishable from them. If all of this deception was for the purpose of misleading the ants, it would seem as though it would have been carried further, and obtained while the Capsid was at rest. The tips of these pine twigs are practically inaccessible to even the smaller arboreal birds, and against these protection is here unnecessary, while except an occasional spider, invertbrate enemies are equally wanting. In fact, so far as the need for protection in this particular situation is concerned, the whole matter of protective mimicry would fall to the ground, as no protection appears necessary, yet, it seems to me, that the careful investigator would not be justified in dismissing the whole matter as a mere coincidence, but rather in searching elsewhere for the causes of a phenomenon of which the effects only are here perceivable. The polished surface of the abdomen of an ant reflects the rays of light in such a manner as to appear like a narrow band of white, of which the transverse white fascia on the wing covers of *Pilophorus amœnus*, when that insect is in motion, appears almost the exact counterpart. I have never observed *Euderces pini* in life, but it does not seem impossible that it too may move about in a similar way, and both together mimic the ant where protection is necessary, my observations being made where but two of the three actors are present, and no protection necessary.

Another diminutive Capsid, *Halticus bractatus*,‡ is found in Ohio, and among other plants affects Red Clover, *Trifolium pratense*, feeding in all stages upon the upper side of the leaves. The effect upon the plant is to discolor the leaves, but this really affords protection to the young, as the changed color more nearly harmonizes with that of their bodies. The adults are black with antennæ and legs, except the femora, yellow, the femora being also black, both sexes being saltatorial. The male has the normal form of an Hemipter, but the female differs entirely in appearance, and simulates to a remarkable

*Kindly determined for me at the Department of Agriculture.

†Kindly determined by Professor Herbert Osborn.

‡ Also determined by Prof. Osborn, who, with my assistant Mr. C. W. Mally, found the species quite abundant in Iowa, the latter gentleman observing it also in Northern Ohio.

degree, a beetle, *Chætocnema parcepunctata*, also very common on clover and other plants. Curiously enough, where I find the former in greatest abundance, there are almost none at all of the beetles, while in a clover field not over one-fourth of a mile away, the beetles are very abundant and none at all of *Halticus bractatus*. That we have here a well defined case of simulation can hardly be doubted, yet the simulating form and the form simulated avoid each others company as if mortal enemies, there being no other forms present that at all resemble them.

I have made no experiments with any of these insects in order to determine whether or not they are distasteful, for the reason that any results obtained with the facilities at hand would have added to instead of reducing the complication. I might, like Professor Plateau, have eaten some of these insects, and learned whether or not they were distasteful to me, or I might have fed them to domestic fowls, or wild birds in confinement, but failed entirely of securing the data required. It seems to me that the only testimony in these matters, worthy of consideration, is to be found in the stomachs of insectivorous birds, and other vertebrate enemies if any, shot while feeding in the exact locality and under perfectly free and natural conditions. Giving a bird perfect freedom and allowing it to make its own selections and discoveries is one thing, while confining it, and doing these things for it, is quite another. It is what these natural enemies actually do, under perfectly natural conditions, that we must learn, and not what they can be induced to do.*

Over a large portion of the United States, and to a less extent in Canada, primitive conditions no longer obtain, while modern conditions are undergoing a constant change, the plow and axe of the husbandman having exterminated many forms, both vertebrate and invertebrate, if not entirely, over large tracts of country, and we may and probably do have cases of peculiar coloration and movements that were once protective, but now remain only as vestiges of a former state of affairs, the forces that brought them into existence no longer existing, except locally.

One phase in the radical changing of the natural flora and fauna over areas of greater or less extent, whereby both plants and insects are entirely displaced by others, emphatically different, is shown by the two accompanying illustrations, showing the bed of a small lake just prior to and after being brought under cultivation, and an aquatic insect fauna displayed by another, terrestrial, and more or less connected with the introduced flora. (See plate preceding, page 65).

In Northern Illinois a species of willow, *Salix discolor*, the leaves of which are nearly white on the under side, grows in wet places, on hummocks, and to the height of from one to six feet, forming a regular compact cluster. The foliage is fed upon by a hard, heavy bodied beetle, an inch or more in length, and often nearly a half inch across the shoulders, in color ebony black with white pubescence, which on the elytra is arranged in irregular transverse fasciæ, with more or less parallel markings, all of which combine to give the insect the appearance of a white surface, irregularly tessellated with black. This beetle, *Plectrodera scalator*, fig 82 feeds by eating holes in the leaves, or irregular notches, leaving the mid and lateral veins, with irregular borders of the leaf along these nearly intact. The beetle remains on the under side of the leaf, the eaten portions of which, against the background formed by the interior of the thicket, appear black, while the uneaten portions appear nearly white. In this way a beetle stationed on an uneaten leaf has almost the exact appearance of a leaf partly eaten, and so perfect is the deception that a fairly good collector may pass some years in a locality where the species is very common, without seeing a single specimen, until he detects the deception. Aside from its considerable dimensions and hard body, this beetle is armed with a rather formidable spine on each side of the thorax, thus rendering it rather an undesirable sort of prey for any of the smaller birds, and altogether too much so for any invertebrate enemies. In

Fig 82.

* I may be permitted to state that, in Ohio, birds cannot be shot for the purpose of making scientific investigations, without running the risk of being arrested and heavily fined therefor.

the locality in Illinois, where I studied this species, only two vertebrate enemies can be said to exist, one the Skunk, *Mephitis mephitica*, and an occasional entomologist, neither of which are at present abundant. Does it appear likely that all of this is brought about by mere accident, or is it not far more probable that protection was once gained, and elsewhere the deception may continue to give protection?

There are still other points in this problem that seem well worthy of careful consideration. We hear the terms, warning colors, protective mimicry and protective coloration, etc., used, as a rule, in the sense of a finality. Just as though these particular workshops of nature had finished their mission, and were now closed indefinitely; and while we have ample supplies of the finished product, there is none at all in process of construction. Have we here no transition stages? We are dealing with some of the forces that go to make what we term evolution, a process going on, as is believed, continually and everywhere about us, and if this is true might we not confidently look for species and varieties that are in the process of becoming protectively, or even warningly colored, or the condition which we term protective simulation not quite obtained? If perfect protection is never quite reached, does not this of itself presuppose progressiveness and, therefore, instability? May we not, in fact, in the future come to measure the antiquity of some of our species by the degree of perfection with which they are mimicked by others? It would probably necessitate remaining together through a long period of time in order to enable an unprotected, younger and therefore less stable form to gain protection from a distasteful form, especially as the advance in that direction must necessarily come from the weaker, unprotected and younger form. To illustrate, our *Danais archippus* is supposed to be a very old species, while *Limenitis disippus* is supposed to be a much younger species. What is true here would also obtain in the case of *Podosesia* and *Polistes*, thus indicating the greater antiquity of the latter, though probably belonging to a younger order than the former. Mr. Gahan has shown* that there is a remarkably close resemblance between seventeen species of *Diabrotica*, inhabiting Mexico and Central America, and an equal number of species of the genus *Lema* occurring in the same section of country. Among the species of *Diabrotica* given, but one, *D. vittata*, is known to occur north of Mexico, and none of the species of *Lema* here sufficiently resemble any of the species of *Diabrotica* to lead to the suspicion of protective mimicry. In fact, it is only along the Mexican border that we have any striking resemblance between any of our species and those of the latter genus. In the states bordering on Mexico, Professor Wickham tells me that *Andrector 6-punctata* bears a striking resemblance to *Diabrotica 12 punctata*, and another species of *Andrector* is very much like *D. tricincta*. There is no positive proof that these are cases of protective mimicry, and Mr. Gahan does not claim this for the cases of close resemblance to which he calls attention, but in all of these there are certainly strong grounds for suspecting that such will ultimately prove to be the case. I have elsewhere †shown that there is every probability that the ancient home of the genus *Diabrotica* was in northern South America, many North American species originating in Central America and Mexico. It would seem, then, that *D. vittata*, *D. 12 punctata* and *D. tricincta*, having spread northward from Mexico, and being the oldest northern forms of the genus, might be mimicked in Mexico and the adjacent portion of the United States, because of having occurred there a sufficient length of time for such conditions to be brought about, while farther north they, with the rest of the genus, are comparatively recent comers, and sufficient time has not elapsed to develop cases of protective mimicry.

In conclusion, I desire that nothing in this paper shall be so construed as to, in the remotest degree, favor hasty or unwarranted conclusions in studies of warning colors, protective mimicry or protective coloration, but I do wish to urge that the same caution and painstaking labor should characterize our action in proving, finally, possible cases of these phenomena that would be exercised before accepting such, were the possibilities

*Trans. Ent. Soc. Lond. 1891, pp. 367-374.

†Jour. N.Y., Ent. Soc. Vol. III., pp. 158-166.

greater or amounting to probabilities, that we shall lean no more or less to the pessimistic than to the optimistic, but weigh every fragment of information, be it negative or affirmative, with equal care and discretion.

The points that I have tried to emphasize are:—(1) That a form of animal life may be distasteful to other forms, and so far as these are concerned, warningly colored; but neither the one or the other, where the form to be protected from is not a persistent and perpetual enemy, that, unrestrained, would threaten the extinction of the form preyed upon; (2) That a mimicking form may profit by a protective resemblance, not only where both it and the form mimicked occur together, but throughout the area of distribution of the deceived form, whether the mimicked form be present or not; (3) That a form, closely resembling in appearance a mimicking form, though occurring at a different time of year, or in a different locality, may profit to a greater or less degree by such resemblance, even though both mimicked and mimicking forms are absent, provided, however, the form protected from has somewhere come in contact with the distasteful form and learned by experience that it is inedible; (4) That we may and probably do have cases of partial deception, and, therefore, partial protection; (5) That cases of mimicry may occur where, owing to the fact of the enemies having become exterminated, or the mimicked and mimicking forms drifted into places inaccessible to such enemies, no protection is given or required; (6) That these problems are most far reaching, and we have as yet scarcely begun to study them in their entirety, hence the fragment hove over among the rubbish may yet prove to be the keystone of the archway through which we are to make our way into one of the grandest and most sublime of nature's many temples.

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## THE SAN JOSE SCALE.*

By F. M. Webster, Wooster, Ohio.

My topic is not of my own choosing, but the one assigned me by the Vice-President and also by the Secretary of the American Association of Nurserymen. I mention this fact, not in the way of compliment, but because so much has been said in public print regarding this pest during the last year or two, that I may not be able to present much that is new. About all that I shall attempt to do will be to bring together all the facts in our possession and point out to this association, for its consideration, some lessons that the past has taught us, and the possibility of profiting by such lessons in the future. To me, though not a nurseryman but one whose business it is to protect some of their interests, the introduction of the San José scale into the country lying to the east of the one hundredth meridian, and its suppression, so far as this has been accomplished, has meant something more than the mere study and investigation of the pest; more even than the overcoming of it and preventing its further diffusion. It has appeared to me as though, in the last half of the last decade of the nineteenth century, there had been presented to our people a test case, as it were, as well as a reminder that the coming twentieth century would bring to us problems which we had not previously been called upon to solve. The question that seemed to me to be involved was this: Can a republican government, composed of nearly half a hundred minor governments, protect its people from the ravages of a diminutive insect pest that has been introduced among them to devastate their orchards and fruit farms? What will be done under such circumstances, and who will be the ones to do it? This scale is a serious pest, but is it not, besides this, the straw that denotes the direction toward which the wind is blowing? We have but to cast our eyes toward the State of Massachusetts where a fierce battle is being carried on against another imported pest of our orchards

* This valuable paper, read at the Twentieth Annual Meeting of the American Association of Nurserymen, at Indianapolis, Ind., June 12th and 13th, 1895, has been kindly furnished us by the writer, and will be found well worthy of perusal in view of the fact that this insect may at any time be found in Ontario. —Ed.

and forests, solely by one member of this republic, while the others are simply spectators looking on with a disinterestedness that amounts almost, if not quite, to a total indifference These are the two at present, most important introductions of foreign insect pests, but no one can for a moment suppose that others will not follow, coming as with the San José scale, from we know not where. You, gentlemen, are engaged in a business that necessitates the exchange of scions, grafts, trees and shrubs, but may also be disseminators of these pests not alone to your customers, but to each other. And, whether you will or no, you cannot escape being foremost in the settlement of a problem that half a century ago was unthought of. Hence, while I address you on the subject of the San José scale, it will be to view it as a factor in what seems to me to be a great and difficult problem in the future of your business; and with this explanation I will proceed to consider that factor.

The San José scale was first observed in this country in the locality in California from which it derives its name, coming from we know not where, but probably from either some of the islands of the Pacific or else some of the Asiatic countries beyond. This introduction is thought to have taken place about the year 1870, and began to attract the attention of fruit growers about three years later, but so far as known only in the locality above indicated. In 1880 Prof. J. H. Comstock described the species, and wrote as follows: "It is said to infest all the deciduous fruits grown in California, excepting the peach, apricot, and black Tartarian cherry. It attacks the bark of the limbs as well as the leaves and fruit. I have seen many plum and apple trees upon which the fruit was so badly infested that it was unmarketable In other instances I have seen the bark of all the small limbs completely covered by the scales. I think it is the most pernicious scale insect known in this country." For the reason here given, Prof. Comstock gave it the name of *Aspidiotus perniciosus*, and I may here add that it has since been found to occur on both the peach and apricot, and fully merits the name given it by the describer. It appears to have spread quite rapidly, for in 1882, nine years later, it had extended over all of the fruit growing regions of California and across Oregon into Washington. As late as 1893, the Los Angeles Horticultural Commission, in their report for that year, stated that the pest, if not speedily destroyed, would utterly ruin the deciduous fruit interests of the Pacific coast; that it not only checks the growth of the trees, but covers them literally entirely, and the fruit nearly as much so, and, if left unchecked, the tree is killed within three years' time. This will serve to show you the serious nature of this little pest, as demonstrated by its twenty-five years' residence on the Pacific coast.

I will occupy a few moments here to consider its probable origin, though, as before stated, we do not as yet know the land of its nativity. It is found in Chili, but was clearly introduced to that country from California. It also is found in Hawaiian Islands, having been introduced from California on prune and peach trees, and also in Australia. But nowhere in these countries has it been found inhabiting in ligneous vegetation, which we entomologists claim, must be done in order to prove the nativity of the pest. Quite recently, Professor Cook has sent it from California on the Loquat, *Photinia japonica*, and, as will be observed, there are several of our forest trees included in Dr. Lintner's list, but this proves nothing as it would be surprising if, in its twenty-five years' residence in this country, it had not begun to adapt itself to our native flora, precisely as some of our native parasitic insects are beginning to learn that they can add it to their bill of fare. Considerable of the nursery stock required in California is grown on some of the smaller islands of the Pacific, as for instance, Tahiti, and it seems at least possible that we may in this way have acquired a pest that may be an inhabitant of an obscure island, and, for aught we know, it may be so inconspicuous there as to require the trained eye of the naturalist to detect it.

The insect itself, Fig. 83, belongs to a group known as armored scale insects, their nearest allies being the Oyster-shell Bark-louse, while still farther removed are the Mealy-bugs. We have here in the east a somewhat similar species that I have found on peach, plum, pear and maple. This is known as the Putnam scale, *Aspidiotus ancylus*,

having been first described by the late J. Duncan Putnam, from Iowa. It is known to occur on the following plants also, ash, beech, bladder-nut, hackberry, linden, oak, osage-orange and water locust. This is often mistaken for the San Jose scale, even by those

Fig. 83.—San José Scale, female enlarged and part of infested branch (life size.)

who are quite familiar with the latter. My own manner of distinguishing between these two scales is to first observe if the disc is circularly wrinkled and the elevation in the centre surrounded by a depressed ring; if the scale is very flat, or if it appears to rise

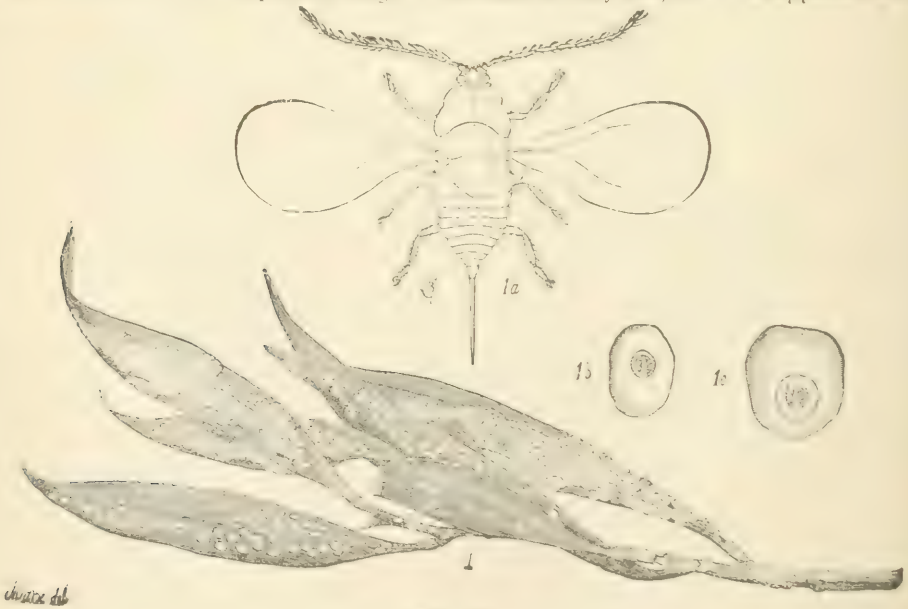


Fig. 84.

gradually from the outer edge to the base of the elevation; if the scales are disposed to crowd in compact patches. If the disc is circularly wrinkled with a deeper ring about the base of the elevation; if the scales crowd each other closely and give the tree a gray

appearance, it is the San Jose scale. If the disc is smooth, and the central point rises out of a smooth area, it is probably the Putnam scale. Another scale that has come to me several times as the San Jose scale, is the Oleander scale, *Aspidiotus nerii*, Fig. 83, which also attacks ivy. But this is of a lighter color, flatter and longer.

The Rose scale, *Diaspis rosæ*, has been sent me, both on the rose and raspberry, with the query as to whether or not it was the San José scale. But this is also larger, more depressed and of a lighter color. In short, we have nothing that clusters so thickly together on the host plant, and gives it that peculiar gray color, which once seen will never be mistaken for anything else.

In regard to the life history of the species now under consideration, it appears to differ from that of many of our scale insects in that instead of reproducing by laying eggs, the mother gives birth to her young. As by far the most careful studies made on this species have been carried on at the Department of Agriculture, under the direction of U. S. Entomologist, Dr. L. O. Howard, I take the liberty of giving Mr. Howard's statement in his own words. He says: "Although this insect has been known in California for about twenty years, its life-history has not been carefully worked out by California writers Professor Comstock described simply the male and female scales and the body of the adult female. The male was unknown to him. In his work on the Injurious Insects of the Orchard, Vineyard, etc., published at Sacramento in 1883, Mr. Matthew Cooke briefly described the male insect and published a crude figure of it. He further stated that the species produces three broods in California, the first "about the time the cherries begin to color, the second in July, and the third in October." The statement is made by Comstock that the eggs are white," and Cooke further says that "each female produces from thirty-five to fifty eggs."

"Upon the appearance of the insect in the east, potted pear trees were secured for the Insectary of this division, and colonies of the scale were established on them. Their life-history has been followed with more or less care throughout the season, and the following brief statement of the life cycle of the insect is based upon daily observations made during the summer by Mr. Pergande.

"It has already been ascertained during the late summer and fall of 1893 that the insect is viviparous, that is, gives birth to living young, and that it does not lay eggs. We are unable to reconcile this condition of affairs with the statements just quoted from Comstock and Cooke, but it occurred to us that, as with certain of the plant-lice, there might be winter eggs, with viviparous females in summer. When winter came on, however, it was found that the insect hibernated in the nearly full grown female condition, and that these females, about the middle of May, began to give birth to living young as their ancestors did the previous fall. In no instance, therefore, have we observed the egg (unless the young still in the body of the female and enveloped in the embryonic membrane may be so called). Over-wintered females continued to give birth to living young day after day for six weeks. This condition of affairs produces, early in the season, a confusion of generations, which makes observations upon the life-history of the insect extremely difficult and only to be accomplished by isolation of individuals. It also seriously complicates the matter of remedies, since, as numbers of the larvæ are hatching every day, and as they begin to form their almost impervious scales in two or three days, a spraying operation at any given time will destroy only those larvæ which happen to be at that time less than three days old, while on the day after the spraying new larvæ will be born to take the place of those just killed.

"Observations upon isolated individuals show that the newly hatched larvæ, after crawling about for a few hours, settle down and commence at once to form a scale. The secretion is white and fibrous. In two days the insect becomes invisible, being covered by a pale, grayish-yellow shield, with a projecting nipple at the centre. This nipple is at first white in color. Twelve days after hatching, the first skin is cast. The males at this time are rather larger than the females, and have large purple eyes, while the females have lost their eyes entirely. The legs and antennæ have disappeared in both cases. Six days later the males begin to change to pupæ, while the females have not yet cast the

second skin. At this time the females are so tightly cemented to the scale that they cannot be moved without crushing. In two or three days more, or twenty to twenty-one days after hatching, the females cast their second skin, which splits around the margin of the body. At twenty-four days the males begin to issue, emerging from their scales, as a general thing at night. At thirty days the females are about full grown, and embryonic young can be seen within their bodies; and at from thirty-three to forty days the larvæ begin to make their appearance.

"These observations were made upon young which were born of over-wintered mothers late in June; but it must be remembered that similar larvæ had been hatching since the middle of May. The period of thirty-eight to forty days may be accepted as the length of time occupied by a single generation; but, while this particular generation came out in the insectary about the 1st of August, the adults of the second generation from the earliest born individuals would have made their appearance toward the end of June. Full grown females which began to give birth to the second generation of young on August 1 were kept in view. Three weeks later they were seen still to contain numerous embryos. Young larvæ were running about, while others of the same generation were in all stages of development. The male scales were fully formed, and some contained mature pupæ. The small trees upon which these insects were colonized the third week in June were almost completely covered with the scale. The larvæ evidently made no effort to crawl away from the tree, and none, in fact, reached the rim of the flower pot. The greatest distance away from the tree at which larvæ were noticed was about two inches. Up to this time the insects had confined themselves almost entirely to the branches, and the leaves were still quite free. The first males of the second generation were noticed on August 27. By September 7, or five weeks and a half after the adult females of the first brood began to give birth to young, some of them were still living and giving birth to occasional young. The majority of them, however, were dead or nearly exhausted, while their first larvæ were almost ready to reproduce. Five days later a few of them were still giving birth to an occasional young, while their offspring were also rapidly reproducing.

"At the rate of development observed, between May 15 and October 15 four generations from the over-wintered females developed. The larvae continued to issue until after the first frost in October, at Washington, and on October 24, at Lewisburg, Pa., the writer saw recently-settled larvæ of not more than five days of age.

"There seem to be five generations in the latitude of Washington. Owing to the method of reproduction, these generations immediately become inextricably confused, and the insect after the middle of June may be found at any time in almost any condition. The females which over-winter have, in the great majority of cases, reached a sufficient degree of maturity to have become impregnated by late-issuing males. It seems probable that the male rarely hibernates in any stage, although we received on April 3, from Charlottesville, Va., twigs which carried a few male scales containing males in the pupa state. These probably hibernated as full grown male larvæ. Whether unfertilized females over-winter we are not certain; if they do, these occasional over-wintering males will fertilize them.

"The San José scale differs from all others in the peculiar reddening effect which it produces upon the skin of the fruit and of tender twigs. This very characteristic feature of the insect's work renders it easy to distinguish. Around the margin of each female scale is a circular band of this reddish discoloration, and the cambium layer of a young twig where the scales are massed together frequently becomes deep red or purplish. Small spots on fruit produced by a common fungus *Entomosporium maculatum*, Lev., sometimes so closely resemble the spots made by the scale as to require close examination with a lens. When occurring in winter upon the bark of a twig in large numbers, the scales lie close together, frequently overlapping, and are at such times difficult to distinguish without a magnifying glass. The general appearance which they present is of a grayish, very slightly roughened, scurfy deposit. The rich natural reddish color of the twigs of peach and apple is quite obscured when these trees are thickly infested, and they have then every appear-

ance of being thickly coated with lime or ashes. Even without a magnifying glass, however, their presence can be readily noted if the twig be scraped with the finger nail, when a yellowish, oily, liquid will appear, resulting from the crushing of the bodies of the insects."

The female scale is flat, almost circular in outline, dark mottled with gray color, with a small elevated spot at or near its centre which is black or yellowish; it measures about one sixteenth of an inch in diameter, but under favorable conditions may attain to the size of one-eighth of an inch The fully developed female can only be observed by removing the scale with which it is covered at a time when she is just about to give birth to her young. She will have then lost both her legs and antennæ, being now only provided with a long delicate proboscis consisting of four thread-like bristles encased in a two jointed sheath. The body is almost transparent, and the young can be clearly distinguished within.

The male scale is black and somewhat elongated when fully formed. It is often oval in shape, smaller than the female, and more abundant. The larval skin is covered with a secretion, and its position is indicated by a single nipple-like elevation between the centre and anterior margin of the scale. The fully developed male only has wings. The body is of a light amber color with dark brownish markings, and terminates in a slender stylet as long as the body. It is, however, too minute to be of interest to any but naturalists, having to be always examined with a microscope.

Such was the pest that was, as we supposed, lurking only along the Pacific coast, with a vast width of mountain and desert lying between it and the fair lands and thrifty orchards of the Mississippi valley and beyond. We did not for a moment dream that the pest had gained a foothold along our eastern coast as well, and was each year being sent into the heart of our land, and even the entomologists were in blissful ignorance of its presence. In 1892, Professor Townsend had reported it at Las Cruces, New Mexico, but that was almost as far off and isolated as California, and we still slept on in our supposed security Early in August, 1893, there came to the Division of Entomology at the Department of Agriculture at Washington, a small bundle of pear and peach twigs from Charlottesville, Va., the sight of which fairly raised the First Assistant Entomologist, who examined them, out of his chair, for he at once recognized the San José scale. But even yet it was thought to be only an accidental occurrence. Later investigations of another outbreak indicated that the pest had come from a prominent nursery in New Jersey, and on being inspected the insect was found to have become thoroughly established and probably had been for several years, as the trees whereby the insect had been traced to this nursery had been sent out in 1888. I shall here follow a policy that has always appeared to me to be the only just one for an entomologist to follow, and give the name of the nursery, which is that of Mr. John R Parry, of Parry, New Jersey. This was the first intimation that this firm had of the seriousness of a pest that they failed to recognize, though on referring to their books they found that in 1887 they had ordered from John Rock, of San José, California, a quantity of Kelsey's Japan plum trees, and that these trees had been shipped by Mr Rock's order from the nursery of the Stark Brothers, of Louisiana, Missouri.*

*Mr. Stark, of this firm, made the following explanation at the close of the reading of the paper:—

As Prof. Webster mentions our name, we wish to state the circumstances in full as we now recall them: In 1885, we had the pleasure of visiting the nursery of John Rock, at San Jose, California. Mr. Rock is well known as one of the principal California nurserymen, and it is needless to say that the visit was interesting, and instructive as well. Among other things particularly noted, was his method of treating trees before shipment to destroy the San Jose scale. This method he supposed to be entirely effective, and, remembering this, in the spring of '87, the Kelsey plum being then a scarce novelty, we ordered a lot of first-class Kelsey plum trees from Mr. Rock; but as a good many of us have learned "first-class" trees on the Pacific coast mean a very different thing from first-class trees in the east. On the coast, it seems they sometimes go into rows of one year trees and dig about everything clean that is thrifty and two or three feet in height, or even less; so when the trees arrived and the lid was removed from the box, showing one year trees running from about eighteen inches in height upwards, it was apparent we could not accept nor use the grade and we so wired Mr. Rock, who wired in reply to express them to the New Jersey parties, and the trees accordingly were immediately expressed to Messrs. Parry and to J. T. Lovett, thus quickly removing every one of these Kelsey trees from our grounds—a most fortunate circumstance for us, as it has since appeared.

The Parry people were as much astounded at the revelation as were the Government Entomologists, and promptly destroyed over $1,000 worth of stock, and as promptly stopped shipping anything from their nursery, buying from localities that are even now beyond the area of infection, the trees whereby to fill their orders. From this time on this firm has followed this policy and bent their whole efforts on stamping out the pest on their premises, sparing no expense in the accomplishment of their purpose. I cannot myself find words to express my own commendation of the course of this firm, and I do not believe that the American people will overlook or underestimate the public spirited acts of the Messrs. Parry Had all of those who are engaged in your vocation, and were similiarly unfortunate, followed this course, the entomologist and the agricultural press might have been spared the unenviable task of exposing their disgrace. The introduction of the San José scale from California was a sad piece of carelessness on the part of at least four firms of nurserymen, as either one, had they applied to the Department of Agriculture, might have learned and avoided the danger, as the Division of Entomology had, at the time the introduction took place, two of its special field agents in California, and would most certainly have pointed out the danger had an opportunity been presented. Up to the time that the proprietors were notified of the presence of the pest, then, carelessness only can be charged against them, and they should be judged according to their acts since that time. The Parry Brothers, when the pest was found established on their premises, asked that the fact be withheld from publication, as it would otherwise ruin their business. Considering the efforts being made by them, it was certainly no more than just to give them an opportunity to show what they could and would do, and as we yet have no reason to suspect that they have betrayed the confidence placed in them by the Government and State Entomologists, and, besides, they have willingly furnished entomologists with a list of purchasers who were liable to have received the pest with trees sold from their nursery, prior to this discovery of its presence among their nursery stock. What more could they have done to undo the wrong, or prevent its continuation?

Soon after the foregoing outbreaks of this pest had been investigated, another badly infested nursery was located in New Jersey, that of the Lovett Company, at Little Silver, and which, as we now know, was infected in precisely the same way and at the same time as the first. This nursery was known to be infested as early as September, 1894, when it was visited by the entomologist of the Experiment Station of that State, and the fact pointed out to the officers of the company, who promised to destroy and disinfect their trees before sending them out to their customers. The New Jersey entomologist took upon himself the responsibility of stating in public print that these precautions were being taken, and that everything possible was being done by the company, whose name he did not give, probably supposing that he was dealing with men who would readily see that their own interest would lead to such a course, and was not as active in holding them to their promise as he would have been justified in doing. It was late in December—over three months later—that I received twigs of apple infested by this scale from Clermont county, Ohio, and on promptly visiting the orchard found some twenty-five trees literally covered with the pest, and three times as many more infested to a large degree, but all in such a condition that sixty of them have since been dug up and burned These trees had been purchased from the Lovett Company and planted out in spring of 1890. In a note given to the daily press on the discovery of this serious outbreak, I stated the fact that the trees had been purchased from this firm, but did not accuse them of having, at that time, the scale among their trees, though the fact was not unknown to me Promptly on the appearance of my note came a letter to the Director of the Ohio Experiment Station, which ran as follows:

LITTLE SILVER, N.J., December 28, 1894.

*Director Experiment Station, Columbus, Ohio:*

DEAR SIR,—One of our customers has sent us a clipping from a Columbus paper, in which is stated that trees owned by one Mr Nicolis have been found infested with the San Jose scale. You will please give us all the information you can in regard to this matter. We would like very much, indeed, to have some branches from the trees referred to for examination ourselves. We have made a critical examination of our trees here in the nursery and also fruiting trees, using the microscope, and can find no trace whatever upon any of them of the San José or other scale. Having read reports upon the San Jose scale, we are confident that we could detect this insect if it existed upon our trees.

Yours truly,

(Signed) THE LOVETT COMPANY. H.

Now here was a serious state of affairs indeed. An official entomologist, whom I had known for years, had given the information, and here was a firm assuming their innocence, and being compelled to go over a whole nursery with a microscope, in fruitless search after the San José scale. Gentlemen, did any of you ever attempt to go over a tree with a microscope? And do you remember how much time it required to accomplish the task; how tiresome it was and how weary you were long before you had finished? Yet here were men compelled to go over a whole nursery, because of an unjust accusation. I promptly sent a copy of the letter of the Lovett people to the New Jersey Experiment Station and asked them to explain the matter. They were able to explain everything except the conduct of the firm, but at that were as much astounded as I was, and again reiterated the statement in regard to the examination with the President and Secretary of the company the preceding September. A month later, in February of the present year, Dr Lintner, State Entomologist of New York, asked them to furnish a list of their sales in his State—such as had been freely and gladly done by the Parry Brothers—explaining at the time its character and the value it would possess in undoing the wrong that they had unintentionally done. After much delay and dickering, the Entomologist of the New Jersey Station received the following modest proposition: "If he (Prof. Lintner) will send us, or you either, a remittance of $250, we will attempt to make the examination desired. But we want a clear understanding before we begin as to the settlement of cost of sending the list he requires." I need hardly say that the money was never sent for there is little doubt but that the list would have been as "scaley" as their trees. Public indignation, however, had been rapidly increasing, and on February 22nd, the Entomologist of the Experiment Station accompanied by a member of the editorial staff of the Rural New Yorker, paid this nursery a visit of investigation, and found that while some more or less effective means had been employed to destroy the scale, there was ample evidence of a carelessness that in many countries would have been considered criminal and cost the firm their plant, if, indeed, imprisonment were not added. I can only repeat here what I said of the action of the first-mentioned firm: it will be a long time before the people will forget these things, and all statements of the Lovett Company will be taken on probation, which probation will, if I mistake not, be a protracted one.

Even while the foregoing developments were proceeding, we became aware that there was another locality of distribution of this pest; viz, Long Island, N.Y.; and it was toward this part of his State that Dr. J. A. Lintner, State Entomologist, turned his attention, with the hope of protecting his people from having the scale distributed among their orchards and farms by Long Island nurserymen.

Dr. Lintner was only faithfully carrying out the duties of his office, and went about doing that duty in a moderate, conscientious manner, that ought to have received the unqualified support of every fruit grower and nurseryman in his State. But he soon found that he had the same diversity of character to deal with as had been revealed in New Jersey. Of the nine nurseries located on the island, but three were found to have become infested, and these, as given in a recent bulletin from the New York State Museum (Vol. 3, No. 13) are owned and operated by Fred Boulon, Sea Cliff; Keene & Foulk, Bloodgood Nursery, Flushing; and Parsons & Son, also of Flushing. The first named, though moving in a somewhat dilatory way, finally destroyed his worst infested trees and sprayed so that it is hoped that no infested stock will be distributed. Of the actions taken by the second named firm, Dr. Lintner, in his bulletin above referred to, speaks in terms of highest praise. As soon as this firm learned of the presence of the scale on their premises they promptly burned the worst infested trees and sprayed the remainder, besides asking for instructions and directions in regard to methods of suppression, they have promptly carried out every one of these, making every effort possible to protect their customers, offering on request to replace at half price all trees sold from their nursery, during previous years, that were found infested by the San José scale. There seems to be no reason why this firm should not continue to enjoy the confidence and patronage of the public. The last firm mentioned, Messrs Parsons & Sons, chose an opposite course, and I may add, deserve opposite treatment. From the first,

this firm paid no attention whatever to the evil, when it was pointed out to them, and when asked to disinfect their stock before shipping it to their customers, stated that they would if they had time; and, later, said they did not have time. There is very strong evidence in the hands of entomologists going to show that this firm made both their last fall and spring shipments, knowing that they were unloading their scale infested trees on the public and scattering this pest, the serious nature of which they could not help knowing, far and wide over the country. Failing in every attempt to secure satisfactory replies to his communications, or even a list of the patrons who were likely to suffer from their impositions, and after your humble servant had pointed out to him that he was only being imposed upon and his moderation toward this firm only being used to further their scheme of unloading their infested trees on the unsuspecting public, that he was forced to call upon the "Rural New Yorker" to expose them. In the issue of that publication for May 4, 1895, the editors, after exposing the Parsons Company, say that the Company made a plea of ignorance of the serious nature of the pest, and supposed it was only one of the many scales that they had known for the last fifty years. No wonder that the "Rural New Yorker" people were boiling over with indignation over a course that was alike unprincipled and un-American, and ask why it was necessary for them to come forward and make business men attend to their duty, telling the company that it was no excuse at all for them to plead ignorance of the dangerous character of the pest and neglect the repeated warnings that have been given. To plead ignorance was a direct insult to State Entomologist Lintner, who had again and again warned them of it and urged them to take immediate steps to prevent distributing it all over the country. These people now, after being publicly exposed, promise to do all in their power to prevent sending out infested stock, and if the public deal with them as they deserve, it will be some time before they will distribute their trees at all, for who will expect them to keep any promise after such evasions as they have attempted? If the entomologists and the press are not again called upon to expose them a second time, it will be a pleasant surprise.

Now, gentlemen, I have criticised harshly, but I sincerely believe not unjustly. I have exposed these people before you, not in order to taunt you with the disgrace of some who follow your calling, but because they threaten interests of yours that I am employed to protect. It is my business and duty to do so. You do not need to deal with these people yourselves to suffer contamination. Let me explain, and this I will do by illustration. Last winter a man came to me in high dudgeon and wanted me to show up a prominent firm of nurserymen in Ohio. He said that he had gone to them in the fall to buy trees. He did not appear to care much what the trees were so long as they were fruit trees and cheap. He said that he had gone to this nursery and found what he thought would answer his purpose, provided the price was right. The trees were poor and expected the price to correspond, "but do you believe," he said, "them galoots wouldn't sell me them trees at any price and said they were going to burn them up, I suppose just to make me pay a big price for others. But I won't do it. I'll buy where I can get what I want and at a reasonable price of eastern nurseries." Now, we all know what sort of a fruit grower such a man would make. One of the sort that sets out his trees and then lets the pigs, cattle, sheep and horses take care of them, and who, if he were to buy scale-infested trees would not find it out until the whole neighborhood was endangered. Suppose such a man buys scale-infested trees and plants them out in your neighborhood, thereby threatening your business, what will you do about it? If he furnishes scale enough to destroy a thousand dollars worth of your stock and ruin your trade for several years, you cannot help yourselves, in the present condition of our laws. You cannot reach the man who sold the trees, and to destroy them on your neighbor's premises without his permission, is to criminate yourself. I have no fears of the pushing, up-to-date fruit grower or the honorable nurseryman, for if they have the misfortune to get this pest, they will stamp it out without compulsion. But I am afraid of the nurseryman who will knowingly or carelessly distribute this pest to careless or indifferent purchasers; and this is precisely where we entomologists are

expected to protect you. In order to protect the people of Ohio, I have felt from the start that it was necessary to first prevent this pest being continually shipped in from infested nurseries, and then use every means to find out infested localities and stamp it out. This is the only way that I can protect the people of my State, both nurserymen and fruit-growers. What is true of Ohio is true in other States, and of other entomologists.

It seems to me that what we need is a United States law, that shall apply equally well in every State in the Union, that will enable those nurserymen who wish to do so, to send their authorized agents into any State to do business, each firm being thus responsible for the acts of their agents. If nurseries desire to sell stock in States other than their own, or the people desire to purchase such stock, they should have legal protection. Then let every nurseryman be obliged to warrant his stock free from insect or fungus pests before transportation companies can accept the same for shipments. This will do away both with the disreputable nurseryman and the tree-peddler, and place your business in the hands of honorable men. You may think it an objection, and possibly a hardship to thus be obliged to guarantee your stock free from these pests, but I fully believe it is precisely what you are coming to and of your own accord. I am fully convinced that within the next ten years every reputable nurseryman will spray his nursery stock several times each year with both insecticides and fungicides, not because he is obliged by law to do so, but because it will pay him well for the extra time and expense. We are beginning to learn that the apple scab begins to weaken the vitality of a tree from the first year onward, and the same is true to some extent with insect pests, that by spraying the nursery rows you can produce a greater number of first class trees to the acre, and so derive a larger profit from your land and the labor bestowed upon it. Now, this is only a suggestion whereby this problem of distributing such pests as the one under consideration can be prevented, at little or no real expense, and those more competent than myself can no doubt improve on the suggestion, and you will readily see that when another case like this comes up, and a nursery is found to be infested the owner has only to purchase his stock for a year or so of his more fortunate neighbor, until he can cleanse his premises and use his product. This will also do away with an injustice that I have seen all along, and, in fact, been obliged to, myself, make use of. I stated at the beginning of this paper that it was but right to give a reputable firm time in which to show what they would do to protect their customers, but it is a rank injustice to others of his profession to publish the fact of the occurrence of such a pest as this in a certain locality or State, and not give names in connection with such information. I am bitterly opposed to the policy that I have been obliged to follow during the last year, knowing, as everyone must, that to quarantine against areas instead of individuals, must work an injustice upon the very ones that are the most deserving of justice. When the word goes forth that this pest is in a certain State and liable to be distributed from it to others, the only protection for the others is to stop all shipments from the whole State, when there may be but a single nursery infested. This is the rankest kind of injustice, and I hope some measures will be devised to prevent a recurrence of such a condition of affairs as we have had with regard to the suppression of the San José scale. I have been obliged to warn the people of Ohio against New Jersey and Long Island, when I knew it was a wrong to the very men that I was trying to help, simply because I could not get the names of the guilty ones, and indicate them to our people. I hope, gentlemen, before you adjourn from your deliberations, you will take some action not only denouncing the course taken by the two nursery firms that I have named, but indicating some policy whereby this problem can be met in a judicious and at the same time thoroughly efficient manner. The San José scale is the latest importation, so far as we know, but it is not at all likely to be the last. Our commercial relations with other countries are not only increasing rapidly and broadening, but the time required for transporting your goods from place to place has been diminishing much more rapidly. It is now possible to remove plants from their native homes in Australia, South Africa, Europe or Asia, and in the short space of a month's time scatter them over the whole country. Destructive insects may thus go into their dormant stage in one country and

emerge in another without having been disturbed or discommoded, something that would have been impossible twenty five years ago. With such strides, such progress in these factors in your business, it will be absolutely necessary for you to bring your business methods up to date, and change to meet your changed conditions. By necessity, you are foremost in the diffusion of these pests of your trees and plants, and it would appear to naturally follow that you should be foremost in taking steps to prevent this diffusion—should lead instead of follow—and I hope you may begin to recognize the situation, and with past experience to guide you, look into the future and prepare to meet these emergencies and overcome them.

Returning for a moment to the San José scale, before closing, I will say that the insect does not appear to spread rapidly, at least not at the start, and is not so difficult to overcome, if given prompt and careful attention. At present it would seem as though it might be wholly eradicated from the orchard or nursery within a year after being discovered. Whale-oil soap, one pound to each gallon of water, makes a wash that is most fatal in its effects, when applied during autumn and again just before the buds start in the spring, followed by a similar treatment in autumn. The use of hydrocyanic acid gas is thoroughly effective, and though rather expensive to use in an orchard, is not so much so where trees can be treated in bundles. Full instructions for using this may be had on application to the United States Department of Agriculture at Washington. It is true that this scale is now established at several points in most of the States east of the Mississippi river, but I am satisfied that all such can be stamped out, provided proper attention is given the matter now while it is yet confined to the orchards into which it was originally introduced. For the present this is the only protection that the nurseryman and orchardist have against this pest, or rather, I might say, against a disreputable fellow of his calling, or a shiftless neighbor; and I would caution you all to keep close watch of orchards in your respective neighborhoods, especially such as have been planted out within the last five years with other than home-grown trees. I find that in some quarters there is a disinclination to let the matter of infection become known. So far as the farmer and orchardist is concerned this is folly, as to have acquired this pest is no disgrace, but a misfortune, and I find that the statement that it has been discovered in a certain locality and promptly eradicated, is an incentive for others to look more closely to their trees and, in case the scale is found, follow the example of their neighbors.

In closing, I wish to call the attention of nurserymen to the fact that the entomologist is working for their interests, both in the matter of protecting them from getting such pests established in their nurseries, and aiding them to get rid of them in case they have been unfortunate enough to have done this. To prevent sending out infested trees from any nursery is a part of the duty of an entomologist, however disagreeable it may be to do so. So long as men are human, it will be necessary to resort to disagreeable methods of preventing them from wronging each other, and the best that can be done is to deal with strict justice toward all.

At the conclusion of Prof. Webster's paper, the following appreciative motion was put to the meeting and carried unanimously:

Col. WATROUS: "I think that the paper that comes out and deals with our interests as fairly and as wisely and intelligently as this one deserves a vote of thanks, and I move that a vote of thanks of this Association be tendered Prof. Webster for his paper and that we approve his course."

The CHAIR: If any of you have any questions to ask of Prof. Webster, he will be happy to answer them; or if any of you have any statements to make we shall be glad to hear them. It is certainly the most interesting subject that could come up in a convention, for it is a matter of dollars and cents for us.

Col. WATROUS asked what would be the proper course to pursue should a nurseryman be so unfortunate as to receive a bundle of trees from another nurseryman which were found to be infested by this pernicious insect.

Prof. WEBSTER: Send them back to the original nursery.

Col. WATROUS inquired further if there were any way by which the insects could be killed on imported stock so that it would be safe to plant the trees and propagate from them. I want to know if it is absolutely necessary that they be burned or reshipped.

Prof. WEBSTER: They could be disinfected by using hydrocyanic acid gas, the management of which you can get by applying to the Department of Agriculture at Washington. It is a very expensive treatment.* One receiving infested stock, if he did not send them back, could hold the trees at the order of the shipper. I do not see that the nurseryman should be called upon to take them at all or to take the responsibility and expense of disinfecting them.

Mr. JEWETT asked what had been done in California. I have heard that they have exterminated it in some localities.

Prof. WEBSTER: They have practically exterminated it in some localities; but they seem to have handled it very carelessly, and it may be said to cover the whole state more or less. They have used the lime, salt and sulphur wash. This has not been fully effective, and further than that we have found in the East that a treatment of great value in California is not so here. They have a resin wash there which it is claimed is fatal. With us it will not kill twenty-five per cent.

A MEMBER asked if there was danger of the San José Scale spreading rapidly unless infested trees were taken up.

Prof. WEBSTER: It is not the travelling of the insect itself, the spread in that way is not rapid; but it may be carried by the wind or by the young insects crawling on to birds which frequent the trees and being by them carried to other trees—so that it is dangerous to have it anywhere. It does not spread very rapidly, and if carefully sprayed it can be controlled and even stamped out. There are four or five places where I know it has been stamped out in Ohio. I would take up and burn any very badly infested trees.

A MEMBER: Could the Scale be carried from California on fruit shipped to us.

Prof. WEBSTER: Yes, it is carried all over the East; but how great the danger may be I do not know. The greater part of the fruit is consumed in towns and cities, and unless the infested fruit is thrown down so close to the trees that the young insects can make their way from the waste peeling to the tree, then there is no danger. I do not look upon this as a serious feature of the case, although it would be well to watch it.

## LEPIDOPTEROUS PESTS OF THE MEADOW AND THE LAWN.

By the Rev. THOMAS W. FYLES, F.L.S., South Quebec.

I very much doubt whether I shall ever see again what was no uncommon sight on the older farms in the "flats" and "intervales" of Brome, Shefford and Missisquoi counties thirty years ago, viz:—a field of Herd's grass (*Phleum pratense*, L.), clean and tall, unspecked with Ox-eye (*Leucanthemum vulgare*, Lam.), Cone-flower (*Rudbeckia hirta*, L.), and Charlock (*Sinapis arvensis*, L.).

I perfectly remember the first appearance of the Ox-eye daisy in Brome. A hot, dry season or two had made a scarcity of fodder, and men had gone down to the "French country" around St. Cesaire, St Pie and St. Marie to buy hay. In the spring, a year or two years afterwards, an old-country farmer, Mr. Terence Courtney, of Iron Hill, pointed out to me, here and there by the wayside, along the line of travel, tufts of "the daisy" which had no doubt grown from seeds shaken from the loads brought in from the low country. He cut up those on his own farm, but his neighbors were not so careful, and now, in hay time, all the meadows round are white with the troublesome weed.

* NOTE.—It has since been discovered that this treatment is not effective against the San Jose Scale unless applied for a longer time than can safely be done without injuring the trees treated. Dr. Howard, in a recent publication, "Some Scale Insects of the Orchard," says: "With the San José Scale the most satisfactory work can be done only with a winter wash." . . . "Up to the present writing, but one absolutely satisfactory winter wash against this insect in this locality has been found. This is whale-oil soap, a pound and a half or two pounds to the gallon of water."—J. Fletcher.

In those days there was much clearing of land on the hillsides and burning of brush heaps and log-piles, and the frequent fires and eddying smoke kept down the numbers of the insect pests of the meadow and the lawn.

The arable land, on which hardwood timber had formerly grown and which was free from stumps, was, in many districts, comparatively of small extent and was well worked. On the newly burnt land Indian corn, turnips and potatoes were grown for a season or two, and then Herd's grass seed was freely scattered to convert it into pasture.

In the neighborhood of South Quebec we have at the present day much slovenly farming. Last June I noticed a meadow in which the grass stood tall and rank and uniform, but it was a meadow of Couch (*Triticum repens*, L.). A meadow golden with that very handsome but most objectionable plant, the Hawkweed (*Hieracium Canadense*, Michx.), or blue with the Succory (*Cichorium intybus*, L) is often seen. A really good meadow of Herd's grass or clover is not common, and what an Englishman would call a fine lawn is hardly to be found in the province. The moist, salt air of the old country seems to be necessary to bring a lawn into perfect condition. It is not my present purpose to to tell of the agricultural remedies for this state of things. I have alluded to it because I wish to say that good tillage has a decided tendency to keep down the numbers of pernicious insects, and that in a well-considered and worked out succession of crops the meadow is likely to thrive. Fall plowing will expose many grubs and pupæ to the attacks of birds and the action of the frost; and cross-ploughing in the spring will give the birds further opportunities that they will be sure to profit by. The occasional removal of rail fences and the rooting out of the growth that springs up about them, will destroy the harbourage of numerous foes; and frequent mowing and the free use of the roller will not only beautify the lawn but crush out of existence many of its insect spoilers.

Of the Lepidoptera certain groups are especially *graminivorous*. They belong to t *Satyrinæ* and the *Hesperidæ* in the *Rhopalocera*; the *Ctenuchidæ*, the *Arctiidæ*, and the *Noctuidæ* in the *Heterocera*; and the *Crambidæ* in the *Pyralidina*.

## Satyrinæ

The Quebec Satyrinæ are:—*Debis Portlandia*, Fabr., *Neonympha Canthus*, Bd.-Lec., *Neonympha Eurytris*, Fabr., *Satyrus Nephele*, Kirby, *Chionobas Jutta*, Hübner.

The most common of them is *Satyrus Nephele*, Kirby, "The dull-eyed Grayling." It appears in July, and frequents the open fields and the borders of woods and copses. Around Montreal it is abundant, in its season, on thistle heads, in neglected spots.

It is brown, with a broad paler brown band near the outer edge of the fore-wings. In this band are two conspicuous eye-like spots. These consist of a bluish white central spot, surrounded by a black circle and a very pale outer circle. The under side of the wings has numerous dark brown cross markings. It lays its eggs in August, and the young larvæ hibernate in the first stage.

In colour the full grown larva is yellowish green, with a dark green dorsal line and a yellow stigmatic line. It has a reddish fork at the extremity of the body.

*Neonympha Canthus* (Fig. 85) is smaller than *Nephele*, and is of a light sandy brown. Its spots are more numerous, and each spot on the under side of the hind wings has *two* pale rings around the black one. Note.—*At the anal angle there are twin spots close together and thus encircled.* Canthus frequents upland meadows, and appears in July. The female lays her eggs in the end of that month.

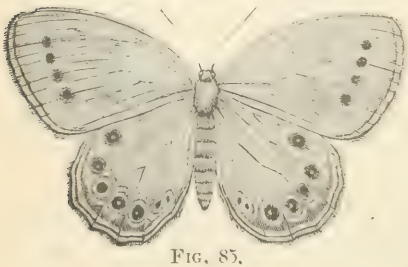

Fig. 85.

The larva is green, with darker green and yellow longitudinal lines, and it has cephalic and terminal horns. It hibernates in the last stage of its growth.

But a more hurtful, because more numerous, group of grass feeders are to be found among the

HESPERIDÆ.

They belong to the genus Pamphila in the Hesperidæ, and are commonly called "Skippers (Fig. 86). The most common of the Quebec species are:—*Pamphila Hobomok*, Harris; *P. Manitoba*, Scudder; *P. Peckius*, Kirby; *P. Mystic*, Scudder, and *P. Cernes*, Edwards. The three last may be seen in June and July scudding about the meadows in droves.

FIG. 86.

Mr. W. Saunders, of London, Ontario, succeeded in raising *P. Mystic* from the egg to the pupa, and has described the changes of the larva in the *Canadian Entomologist*, Vol. I., p. 65. The larva was full-grown in August. It was an inch long, oniscform, downy, with a dull reddish-brown head and a dull brownish-green body. It had many dots of a darker hue and a dark dorsal line. The second segment was whitish with a dark line across the upper surface.

Mr. Fletcher, of Ottawa, raised *P. Cernes* from the egg to the pupa. The eggs were laid on grass on the 10th of July, and hatched on the 23rd of that month. The larva was full grown in September. It was an inch long, of a purplish-brown color, mottled with grey and dark purplish-brown, and it was covered with fine, short, black hairs. It had a black head and a thoracic shield on a white collar. The spiracles were black.

Both *Mystic* and *Cernes* hibernate in the chrysalis.

*P Metacomet*, Harris, hibernates as a larva (Fletcher, *25th Rep. Ent. Soc. Ont.*, p. 4).

*P. Manitoba*, Scudder, spends eight months, or two-thirds of its existence, in the egg. The young larvæ appear in April and are full grown in July. The butterflies come forth in August, and lay their eggs in the same month. For the life history of the species see *Canadian Entomologist*, Vol. XXVII., p. 346.

CTENUCHIDÆ.

Of this family two species are common at Quebec, *Scepsis fulvicollis*, Hubner, and *Ctenucha virginica*.

The imago of *S. fulvicollis* appears in the beginning of June. Its expanse of wings is about an inch and two-tenths. Its head and body are of a deep velvety purple. The antennæ are pectinated in the male, and dentated in the female. The striking feature in the insect is the broad yellow collar from which it derives its specific name. The fore-wings are of a somewhat bronzy black with the costa obscurely yellow. The secondaries are semi-transparent with black veins, and with the inner and hind margins clouded with purplish black.

The full-grown larva of this species is one inch long. Its head is glossy yellow, and its body is slate colored, striped with green, pink and pale yellow, and it has a number of small warts set with white hairs. At the end of July or the beginning of August it spins its cocoon.

*Ctenucha virginica*, in general appearance, resembles *Fulvicollis*, but it is a larger insect; its expanse of wings is an inch and a half. The secondaries are of a deep blue-black, with whitish edges.

The larva of this species, when full-grown, forms a cocoon of the spinulated hairs from its body; it plucks them out and arranges them, and they adhere firmly in the required shape. (*Packard's Guide*, p. 239.)

ARCTIIDÆ.

The Arctian larvæ that have been found injurious to the meadows are chiefly those of *Pyrrharctia Isabella*, Smith and Abbott, and *Leucarctia acræa*, Drury ; both are well known. The former is that brush-like caterpillar, Fig. 87 *a*, black at the ends and chestnut red in the middle, that so often is found under boards and in out-buildings late in the fall and in the early spring. When disturbed, it rolls itself up hedge-hog fashion. It forms its cocoon, Fig. 87 *b*, in May, and the perfect insect, Fig. 87 *c*, appears in June. This last is two inches and a quarter in expanse of wings. Its colour is yellow, with indistinct wavy lines on the primaries and with dark brown spots on all the wings, and also on the abdomen. The secondaries are sometimes tinged with red.

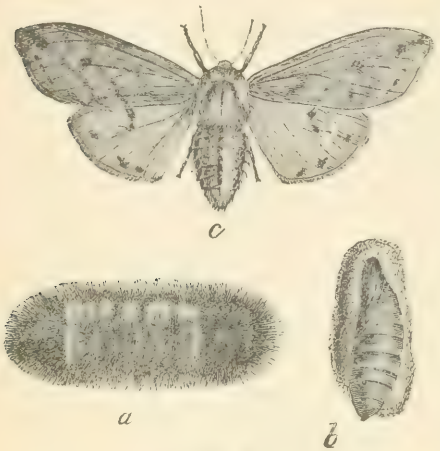

Fig. 87.

The larva of *L. acræa* is the "salt-marsh caterpillar," the ravages of which have been so well described by Harris in his *Insects Injurious to Vegetation*, pp. 351-355. It is about an inch and three-quarters in length and is clothed with long hairs, which are dark brown on the back and lighter brown on the sides Its spiracles are white. This caterpillar appears in June and attains its growth in the end of August, when it spins its cocoon. Of late years the numbers of the "Woolly Bears," as they are commonly called, have been greatly reduced by a fungus which spreads among them and destroys their vitality.

NOCTUIDÆ.

The Noctuids are the night-flying or owlet moths. Their name is derived from the Latin *Noctua*, an owl. These moths, on warm, moist evenings, often beat at the windows of our country houses, attracted by the light. In dress they are a sober "people"—browns and drabs prevail amongst them. But innocent as they are in appearance, they, through their larvæ, work incalculable harm. Amongst these larvæ are the various species commonly classed as "cut worms." Amongst them, too, is the dreaded "army worm."

Of the cut-worms, one that has been particularly marked as injurious to the hay crop is *Peridroma saucia*, Hübner. Of this there are two broods in the year (*Lintner's 5th Report*, p. 64). The eggs of the first hatch in the beginning of May, and the larvæ attain their grown in the beginning of June. The full grown caterpillar is about an inch and a half long. It is of a dirty greyish brown, with spots and markings of yellow and dark brown. The moth leaves the chrysalis in about twenty days, *i e*, in the end of June. It is an insect of considerable size, the wings expanding about an inch and three-quarters. Its colour is brownish or ochreous grey, clouded and spotted with brown and with stigmata outlined with brown. The second brood appears in the fall.

Nothing in the vegetable line seems to come amiss to the caterpillars of this species. In the meadows they strip the clover and cut off the heads of the timothy ; and even the roots of the grasses are devoured by them.

The larva of *Noctua fennica*, Tausch, is another of the grass eating cut-worms. When full-grown it is about an inch and a quarter long In colour it is velvety black, with two irregular and broken yellowish stripes on each side. Its head is brown, with a black stripe down the front, and it has a black, horny shield on the second segment. In May, 1884, Mr. Fletcher found it exceedingly destructive in meadows around Ottawa ; and in the same year it abounded in the meadows of Michigan to such an extent that, to use the words of Professor Cook, of the Agricultural College of that State : "There were meadows through which one could not walk without crushing from a dozen to a hundred at each step."

The moth is not quite as large as *P. saucia*. Its head and thorax are dark brown; the fore-wings are dark brownish grey, with a purple blush; the stigmata are clay-yellow. The renal stigma often takes the form of the letter R; near the hind margin are two small, angulated, black marks.

Another very mischievous insect of the kind we are considering is the "glassy cut-worm," *Hadena devastatrix*, Brace. It bites away the roots in the sod till the grass comes off in patches. I have seen considerable spots in the pastures and meadows of Brome laid bare by this pest.

The eggs of the species hatch early in May; and the larvæ attain their growth in about four weeks. They are glossy green in colour, with the head red, and the thoracic shield dark brown.

The moth has dark ash-grey fore-wings, with several white lines across them and some angulated black spots near the hind margin. The stigmata are black, outlined with white.

These cut worms have been very destructive to meadows in the past, and may be again; and it is possible that other species may become so.

Another group of the noctuidæ injurious to meadows belongs to the genus *Leucania*. A very common species in the group is *Leucania pallens*, Linn., the "Wainscot moth." It may be known by its sandy fore-wings finely lined with a little darker colour, and by the three tiny black dots arranged in a triangle beyond the middle of the wing. It has white satiny hind-wings with a few brown streaks.

*Leucania Henrici*, Grote has dull white fore-wings with pale brown streaks. It has no black dots, and the hind-wings are clear satiny white.

*Leucania commoides*, Gn. is a much darker species, and may be known by the white line in the middle of the fore-wing thrown out by dark brown on either side, and branching into white lines with dark brown streaks between them. The hind-wings are dark with dark brown veins.

*Leucania albilinea*, Hubner is the smallest of the Canadian species known to me. It is not so dark as *commoides*, and the white central streak is branchless. This streak is thrown out by a brown one on the inner side, and, on the outer, by another which widens as it approaches the hind margin where it spreads on both sides. There is also a paler brown stripe along the costa. The secondaries are clouded towards the hind margins and have brown veins. Fig. 89 represents the eggs much magnified, and the caterpillars on an ear of wheat.

Fig. 88.

The two largest of our Quebec Leucanians are *L. unipuncta* Harv. (the Army-worm moth), and *L. pseudargyria* Guen. They somewhat resemble each other, but *Unipuncta* is of a pale reddish brown, or russet hue. *Pseudargyria* is of the tint known in the old country as "whity-brown." Moreover *Unipuncta* has a small but conspicuous milk-white dot in the middle of the fore-wing—hence its name. In place of it Pseudargyria has a pale circle, sometimes imperfect, enclosing a black dot.

When I went to live in Montreal in 1861, ("the Army-worm year"), I noticed, on the Cote-des-Neiges' road, on the wall enclosing the "Priests' Farm," a broad black line, about two feet from the ground, extending the whole length of the wall. I found it was of tar; and, on enquiring as to its purpose, I was told that it was intended to stop the Army-worm in its march from the mountain.

Fig. 89.

*L. unipuncta* the One-spotted Leucanian lays its small,

round, white eggs at the base of the stems and within the folds of the blades of grass. They hatch in eight or ten days, making their appearance in May. In a month the larva is full grown. It is dull black lined with with white, yellow, and pink. It buries itself, forms a cist, and then turns to a mahogany brown chrysalis. The moth appears in about a fortnight.

The Army-worm in its strength is indeed a formidable foe—"The land is as the garden of Eden before it, but behind it a desolate wilderness." A correspondent of the *American Entomologist* told of the creatures coming down upon his lands in a phalanx half-a-mile wide.

Happily for the farmer there are two powerful natural checks to the increase of these troublesome pests; and often when he is at his wit's end *they* are most effective in his service. One is a fungus which spreads from larva to larva and speedily paralyzes and consumes them: the other is the Red-tailed Tachina fly, *Nemorœa leucaniæ*, Kirkpatrick, which lays its eggs upon the living larva in parts where it cannot dislodge them. The maggots that burst from the eggs destroy their victims by thousands.

## Crambidæ.

A very elegant, but very mischievous group of moths are the Crambidæ or "Grass moths," of which we have many species. Their larvæ form silken tunnels at the roots of grasses and work unseen. Their retiring habits make it difficult to follow them in their career; and but little is known of the life histories of most of the species. Dr. Lintner has given us a good account of *C. vulgivagellus*; and other writers have afforded us glimpses of a few of the rest. In the dearth of information the following particulars concerning *C. Girardellus* may be of interest.

## Notes on Crambus Girardellus.

*Eggs.*—Laid dispersedly, pale yellow, melon-shaped, ribbed and cross-lined; hatched the first week in August.

*Young larva.*—One-twentieth of an inch long; head and second segment dark brown, rest of body amber coloured; formed dirty silken tunnels at the roots of the grass; moulted August 20th.

*Larva after first moult.*—Length, one-sixth of an inch; head and horny plate on second segment dark brown, polished; body pale amber beautifully spotted with sienna-coloured warts, and sparingly set with bristles; moulted September 1st.

*Larva after second moult.*—Head of a dirty amber colour, marked with brown patches; body amber-coloured, dotted with large brown tubercles.

At this stage I lost my specimens—the frequent disturbances necessary to the observation of their habits proving destructive to them.

The following is a table of the Quebec specimens of this interesting group:

## Characteristics of the Group.

Antennæ filiform; labial palpi long and beak-like, porrected; wings in repose folded round the body; fore-wing usually oblong and, in most instances, bluntly terminated, but sometimes, as in *C. minimellus*, with a produced tip. Hind-wings ample.

Larva with sixteen legs; head and thoracic shield usually black or brown; body whitish or straw-coloured, somewhat hairy, and sometimes having glassy tubercles. It forms silken galleries at the roots of grasses.

TABLE OF SPECIES.

A.—*Fore-wings white.*

*a.* Pure silvery white.
*C. perlellus*, Scop.

*b.* Satiny white with several dark brown dots.
*C. turbatellus*, Walker.

*c.* Satiny white with a reddish brown dot in the middle of the inner margin, and a reddish brown terminal line.
*Argyria nivalis*, Drury.

*d.* Satiny white with an orange band across the wing.
*A. auratella*, Clemens.

*e.* Satiny white, with a longitudinal orange stripe bordered with brown and widened into a foot near the hind margin.
*C. Girardellus*, Clem.

*f.* White with brown patches and cross-lines.
*C. elegans*, Clem.

B.—*Fore-wings golden.*

*g.* Golden with a silvery stripe running throughout and widened at the hind margin.
*C. unistriatellus*, Packard.

*h.* Golden with a silvery stripe ending in a point near the sub-terminal line.
*C. Leachellus*, Zincken.

*i.* Golden with a very broad silvery stripe ending in a point and having a conspicuous tooth on the inner side.
*C. bidens*, Zeller.

C.—*Fore-wings ochreous.*

*j.* Brownish ochreous, with a short, broad and pointed, silvery dash followed by a silvery stroke.
*C. alboclavellus*, Zeller.

*k.* Pale ochreous, with a silvery dash divided by a yellow streak.
*C. agitatellus*, Clemens.

*l.* Ochreous, with two silvery parallel streaks, the second longer than the first.
*C. lapecotellus*, Clemens.

*m.* Pale ochreous, with brown lines and an angulated silvery line bordered with brown near the hind margin.
*C. hortuellus*, Hübner.

*n.* Pale ochreous, with fuscous longitudinal lines, and two fuscous transverse curved lines.
*C. ruricolellus*, Zeller.

*o.* Pale brownish ochreous with brown lines and two darker brown transverse curved lines.
*C. trisectus*, Walker.

*p.* Reddish ochreous with two wavy, somewhat indistinct cross-lines.
*C. luteolellus*, Clemens.

*q.* Brownish ochreous with numerous brown streaks.
*C. vulgivagellus*, Clemens.

D.—*Fore-wings brown.*

*r.* Glossy reddish brown, with a broad silvery stripe divided into three parts of diminishing length.
*C, myellus*, Hübner.

*s.* Dark brown with white markings and black spots.
*C. Labradoriensis*, Christoph.

E.—*Fore-wings brownish lilac.*

*t.* Brownish lilac (fugacious) with stripe and other markings white.
*C. minimellus*, Robs.

Note.—*A. nivalis* is taken at Sherbrooke ; *A. auratella* and *C. laqueatellus*, in the Island of Montreal ; *C. Labradoriensis* and *C. minimellus* at Bergerville, *C. myellus* at Levis.

The foregoing information as to the times of appearance, habits, etc., of the different species of the grass eating larvæ will have prepared the way for this declaration :

THE VERY BEST PREVENTIVE TO INJURY FROM THE LEPIDOPTEROUS PESTS OF THE MEADOW AND THE LAWN IS THE USE OF THE IRON ROLLER.

The best form of roller for field use is the toothed roller formed in sections. This should be passed over the meadows in spring when the grass begins to shoot, and, if possible, at night, for then both the hibernated and the newly-hatched larvæ will have left their retreats and be at work.

Again the roller should be used after the hay-crop has been taken from the fields, for it will then kill such larvæ and pupæ as have been shaken into the under-growth.

Of course in the use of the roller as in other things, judgment needs to be exercised. *It would not do to pass it over heavy clay-lands in wet weather.*

When an assault of the Army-worm upon standing crops is anticipated, a deep furrow should be run around the meadow. This would disconcert and entrap the foe ; and a suitable log attached by a chain to a whiffle-tree should be in readiness, to draw along the trench, as often as may be necessary, for the purpose of crushing the assailants.

The use of Paris green about the meadows and pasture lands cannot—under ordinary circumstances—be recommended. It is far too dangerous.

## RARE CAPTURES DURING THE SEASON OF 1896.

By Arthur Gibson, Toronto.

It is my intention here to give the benefit, if any, of a few notes I made, and to briefly describe some of the rarer captures and observations in Lepidoptera, which have personally come under my notice during the collecting season just closed.

The present year has been a most remarkable one for the appearance and capture of interesting and rare specimens of Lepidoptera, in and about the neighborhood of Toronto. Butterflies which have never been recorded as having been taken in this part of Ontario, previous to this year, have been collected in considerable numbers during the past summer, while others which were seldom seen on the wing here have been observed and taken again and again. It is something very unusual for this locality to see so many strangers in the butterfly line, as have paid a visit to Toronto throughout last summer. Whether we shall see the same insects here again next year remains to be seen.

The very first specimen which I met with this last season proved to be a good one, and one which I was exceedingly pleased to get. While out on Saturday afternoon, the 11th April, getting some larvæ of *Arsama obliquata*, I took my first specimen of *Brephos infans*. This beautiful moth I found lying in a small pool of water, where the ice had

melted, close to the bank leading down to the marsh. It was a perfect specimen and I presume had probably just emerged from the pupa, and fallen into the water, where it had ended its short existence.

*Argynnis Atlantis*,—This butterfly was very common at the Forks of the Credit, on the 1st July, especially on the milk weed, where it could have been taken in any numbers.

*Argynnis Bellona*.—Appeared to be fairly common at Lorne Park. Took two specimens on the 11th July. Saw several more.

*Argynnis Myrina*.—To me this insect was very rare this last summer. Only saw one specimen during the whole season, and that I took in the early part of the summer.

*Libythea Bachmani*.—This very pretty butterfly, Fig. 90, so easily recognized by its long palpi and angled forewings is seldom met with in Canada. I had the pleasure of taking a perfect specimen at Caesarea, Lake Scugog, on the 12th August last. The only previous Canadian captures of this insect, which have been recorded up to August, of this year, have been made at Toronto, Port Stanley, London and Hamilton.

Fig. 90.

*Chrysophanus Thoe*.—(Fig. 91 the male; Fig. 92 the female.) Although this insect has often been met with in Toronto, I have never taken it here. While away on my holidays, I took my first specimen at Caesarea, on the 12th August. Only saw the one specimen.

Fig. 91.

Fig. 92.

*Pieris Napi*—Summer form *Oleracea æstiva*.—This butterfly was very common at the Forks of the Credit, on the 1st July. I could have taken any number of specimens but confined myself to about 30. I also took this insect at Caesarea, Ont., on the 12th August, where it also appeared to be fairly common. I might add that I took one specimen at Lorne Park, on the 11th July.

*Meganostoma Caesonia*.—(Fig 93.) As has been previously mentioned this insect made its first appearance in this neighborhood during the past season, and was fairly common. The first time I noticed it was on the 13th June, when I took three specimens, and also observed it several times later in the same month, and on the first of July at the Forks of the Credit.

Fig. 93.

*Papilio Ajax*.—While strolling through High Park, on the afternoon of the 14th June, I observed, to me, the first living representative of this Papilio flying very slowly over some small bushes. On June 20th I succeeded in taking a worn specimen and on the 23rd of the same month saw another specimen which looked to be perfect, but as I did not have any appliances handy, did not take it. I also observed this butterfly on the 1st and 11th July.

*Papilio Philenor.*—(Fig. 94.) I should not like to say for sure, but I am pretty well satisfied that I saw a specimen of this butterfly in High Park, on the 20th June. Gave chase to it but to no effect. I do not know whether this Papilio has ever been taken in Toronto or not.

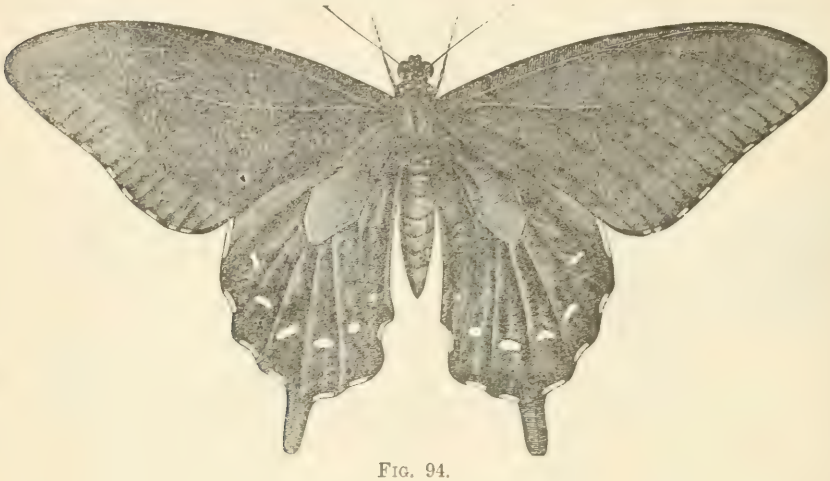

FIG. 94.

*Catocala cerogama.*—This was one of our commonest Catocalas here this year. One night alone over twenty specimens were taken. It is usually a rather uncommon moth, and of late years has not been met with very often.

*Catocala ilia.*—This beautiful moth was quite plentiful at "sugar" during the past season. I took my first specimen on the 20th July and also secured it several times later.

*Catocala neogama.*—I took one specimen of this insect on the 3rd August. This is considered to be a rather rare Catocala in this locality.

*Catocala retecta.*—The black underwings are always eagerly sought after. Several *retectas* were taken here this year. I took my first one on the 24th August.

Catocalas were unusually early this year, most of them being taken in July and August, while in other years I have always taken them towards the end of August and beginning of September.

## THE BUTTERFLIES OF THE EASTERN PROVINCES OF CANADA.

BY REV. C. J. S. BETHUNE, PORT HOPE, ONT.

In our 25th Annual Report for 1894, pages 29-44, I gave a list of the Butterflies of the Eastern Provinces of Canada, so far as known to me, with localities and other observations. So many interesting records and rare captures have been made since its publication, in addition to those given in the preceding paper by Mr. Arthur Gibson, that it seems desirable to publish them here. For convenience of reference, I prefix to the name of the species the number given in the 1894 list.

1. DANAIS ARCHIPPUS, *Fabr.*—Halifax, N. S., rare: Mr. Harry Piers (Proc. Nova Scotia Institute of Natural Science, vol. ix., part I., page xix.)

2. Euptoieta Claudia, *Cram.*—This rare butterfly (Fig. 95) was taken in High Park, Toronto, by Mr. Arthur Gibson, in July, 1893.

Fig. 95.

3. Argynnis Cybele, *Fabr.*—Taken at Sudbury (J. D. Evans); Orillia, common June 16 to August 31 (C. E. Grant). Miss Eaton mentions its capture at Truro, N. S, but Mr. Piers considers that there is some doubt about its identification. (Proc. N. S. Institute—*loc cit*).

4. Argynnis Aphrodite, *Fabr.*—Orillia, June 23 to August (C. E. Grant); Halifax, N. S., abundant (H. Piers).

5. Argynnis Atlantis, *Edw.*—This northern species has greatly extended its range and is now recorded from Orillia, common June 4 to August (C. E. Grant); Toronto and Port Credit, June, July, and August, 1896 (C. T. Hills); London, Sarnia, and Windsor, June and July, 1895 (J. A. Moffat); Truro, N. S., very common (Miss Eaton).

8. Argynnis Myrina, *Cram.*—Orillia, common, two broods, June and August, C. E. Grant); Truro, N. S., (Miss Eaton); Halifax (H. Piers).

9. Argynnis Chariclea, *Ochs.*—"Ranges from Labrador, Hudson Bay and Gulf of St. Lawrence on the east to probably about lat. 51° 25' on the Pacific Coast, nowhere extending into the United States." (F. M. Webster, Can. Ent. xxvi. 119.)

10. Argynnis Freija, *Thunb.*—"Alaska to Labrador and westward to the Rocky Mountains, which range it follows southward to Colorado, about lat. 39°." (F. N. Webster); Calgary (Wolley Dod).

118. Argynnis Idalia, *Drury.*—This lovely addition to the list of Canadian Butterflies was taken at Windsor, Ontario, last year, by Mr. W. S. Cody, who kindly presented a specimen to the Society's cabinet. St. John, N. B. (H. E. Goold

13. Melitea Phaeton *Drury*—Very rare at Truro, N. S. (Miss Eaton); Halifax, (H. Piers).

15. Phyciodes Nycteis, *Doubl.-Hew.*—Orillia, fairly common in June (C. E. Grant); Port Hope, second week in June, 1896. Fig. 96.

17. Phyciodes Batesii, *Reak.*—Mr. C. E. Grant has taken one specimen of this rare butterfly in July, at Orillia, Ont.

18. Phyciodes Tharos, *Drury*—Orillia, common May 24th to July, (C. E. Grant); Truro, N. S. Miss Eaton); Halifax; "very common throughout the Eastern Provinces" (H. Piers).

Fig. 96.

19. Grapta Interrogationis, *Fabr.*—Has usually been considered a rare butterfly in the Province of Quebec, but this year it has been found in great abundance, the larvæ feeding on elm, in the neighbourhood of Montreal. The form *Umbrosa* was abundant at Port Hope in May and June, and *Fabricii* was taken July 29, and as late as November 16, 1896.

20. Grapta Comma, *Harr.*—Sudbury (J. D. Evans); both forms fairly common at Orillia, (C. E. Grant).

22. Grapta Faunus, *Edw.*—Sudbury (J. D. Evans); Orillia, rare (C. E. Grant); Truro, N. S. (Miss Eaton).

23. Grapta Progne, *Cram.*—Orillia (C. E. Grant); Truro, N. S., not common (Miss Eaton)

24. Grapta Gracilis, *Grote and Rob.*—Orillia, two specimens in July (C. E. Grant.

25. Grapta J. Album, *Boisd.-Lec.*—Sudbury (J. D. Evans); Orillia, common in September (C. E. Grant); Truro, N. S., very rare Miss Eaton).

26. Vanessa Antiopa, *Linn.*—Truro, N. S. (Miss Eaton).

27. Vanessa Milberti, *Godt.*—Sudbury and Orillia, Ont.; Truro, N. S.

28. Pyrameis Atalanta, *Linn.*—Sudbury and Orillia, Ont.; Halifax, common (H. Piers).

30. Pyrameis Huntera, *Fabr.*—Orillia (C. E. Grant); Halifax, occasionally abundant (H. Piers).

31. Junonia Cænia, *Hubn.*—Don River Valley Toronto, May 23, 1896 (C. T. Hills); two specimens at Toronto in 1895 (C. H. Tyris).

32. Limenitis Arthemis, *Drury.*—Sudbury and Orillia, Ont.; Truro, N. S.

34. Limenitis Ursula, *Fabr.*—Fig. 97.—Taken at Niagara Falls, Ont., June 25, 1895, and at Port Credit by Mr. C. T. Hills.

35 Limenitis Disippus, *Godt.*—Orillia, second brood in July and August in low lands (C. E. Grant); Truro N. S. (Miss Eaton).

36 Debis Portlandia, *Fabr.*—Sudbury (J. D. Evans); two specimens were taken at Matchedash Bay, near Coldwater, County of Simcoe, Ont., August, 1883 (C. E. Grant). Fig. 98.

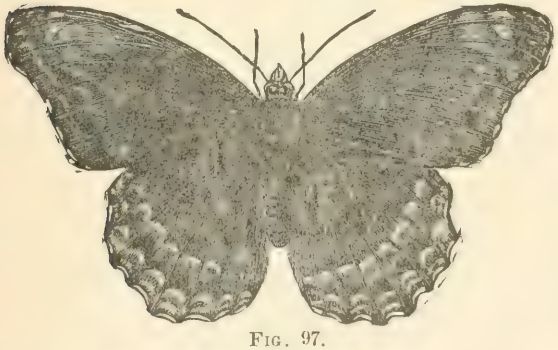

Fig. 97.

Fig. 98.

37. Neonympha Canthus, *Boisd.-Lec.*—Sudbury; Orillia, common in low meadows in July (C. E. Grant); Truro, N. S.; and Lower Stewiacke, N. S. (H. Piers).

38. Neonympha Eurytris, *Fabr.*—Orillia, common in open woods in June (C. E. Grant).

42. Satyrus Alope, *Fabr.*—Niagara Falls, Ont, July 14, 1896 (A. Gibson); Truro, N. S., rare (Miss Eaton).

45. Libythea Bachmani, *Kirtl.*—Taken in Toronto in 1895, and June 7, 1896, by Mr. McDonagh. Fig. 90.

46. Thecla Acadica, *Edw.*—Orillia, usually rare, but very abundant in July, 1896, when forty specimens were taken by Mr. Grant; Toronto, June and July (C. T. Hills).

48. Thecla Edwardsii, *Saund.*—Toronto, June and July (C. T. Hills).

49. Thecla Calanus, *Hubn.*—Sudbury (J. D. Evans); Orillia, rare, taken in July (C. E. Grant

50. Thecla Ontario, *Edw.*—A specimen of this extremely rare butterfly was taken near Grimbsy on the 24th of June, 1894, by Mr. Wm. Metcalfe of Port Hope. The only specimen previously known was taken twenty six years before at Port Stanley by Mr. E. Baynes Reed.

51. THECLA STRIGOSA, *Harr.*—This rare butterfly, Fig. 99, was taken at Orillia in July by Mr. Grant, and at Toronto in June and July by Mr. C. T. Hills.

FIG. 99.

119. THECLA HUMULI, *Harr.*—This is another addition to the list of Canadian butterflies; it was taken at Sudbury by Mr. Evans.

58. FENISECA TARQUINIUS, *Fabr.*—Orillia, moderately common in one locality. C. E. Grant).

63. CHRYSOPHANUS HYPOPHLÆAS, *Boisd.*—Orillia (Grant); Truro, N. S., very common Miss Eaton).

67. LYCÆNA PSEUDARGIOLUS, *Boisd.-Lec.*—Orillia; the form *Lucia* is very common in April and May; *Neglecta* is not so abundant in July and August C. E. Grant); Truro, N. S., rare (Miss Eaton); Halifax, "abundant in the spring and familiar to trout fishermen under the common name of 'Jenny Lind'" (H. Piers).

68. LYCÆNA COMYNTAS, *Godt.*—Toronto in June (C. T. Hills).

69. PIERIS PROTODICE, *Boisd.-Lec.*—Orillia, formerly common; one male was taken in August, 1895 (C. E. Grant

70. PIERIS NAPI, *Esper.*—Orillia, the spring and summer forms are common; *Virginiensis* has also been taken (C. E. Grant); Truro. N. S., not very common (Miss Eaton).

71. COLIAS CAESONIA, *Stoll.*—Fig. 93.—The sudden appearance of this butterfly in considerable numbers in several localities in Ontario during the summer of 1896, is very remarkable. It was taken at Orillia by Mr. James Walker on July 13, and by Mr. Grant from June 6 to July 13; at Toronto by Messrs. C. T. Hills, C. H. Tyris and A. Gibson from June 11 to the end of the month; Little York, near Toronto, June 14. It was also taken at Cartwright, Manitoba. on June 19 by Mr. E Firmstone Heath.

72 COLIAS EURYTHEME, *Boisd.*—Sudbury (J. D. Evans); Orillia, common in 1872, not seen since (C. E Grant).

78. TERIAS MEXICANA, *Boisd.*—No further record, but a cut is given, Fig. 100, to aid in its identification should it again make its appearance in south-western Ontario.

FIG. 100.

79. PAPILIO AJAX, *Linn.*—Port Hope at the end of May and on June 18, 1896; Toronto, four specimens during June C. T. Hills), in addition to those observed by Mr. Gibson.

81. PAPILIO CRESPHONTES, *Cram.*—Taken at Orillia by Mr. Grant. In 1894 we gave a figure of this splendid butterfly and are now able to present pictures of the caterpillar, Fig. 101, and the chrysalis, Fig. 102.

85 PAPILIO PHILENOR, *Linn.*—A specimen was taken at Port Hope, on the 5th of August, 1896; this is the first time it has been observed east of Toronto in this Province. Fig. 94.

87 ANCYLOXYPHA NUMITOR, *Fabr.*—Humber River, near Toronto, and at Port Credit, in June, July and August (C. T. Hills).

89. PAMPHILA ZABULON, *Boisd.-Lec.*—The form *Hobomok* was abundant in sunny places in the woods near Port Hope during the first and second weeks in June, 1896; both forms common at Orillia in May and June (C. E. Grant).

94. PAMPHILA MYSTIC, *Scud.*—Orillia, common in June and August, two broods (C. E. Grant); Truro, N. S. (Miss Eaton).

95. Pamphila Cernes, *Boisd.-Lec.*—Sudbury (Evans); Orillia (Grant); Truro, N. S. (Miss Eaton)

97. Pamphila Metacomet, *Harris.*—Toronto in July (C. T. Hills); Orillia, scarce, in July (C. E. Grant).

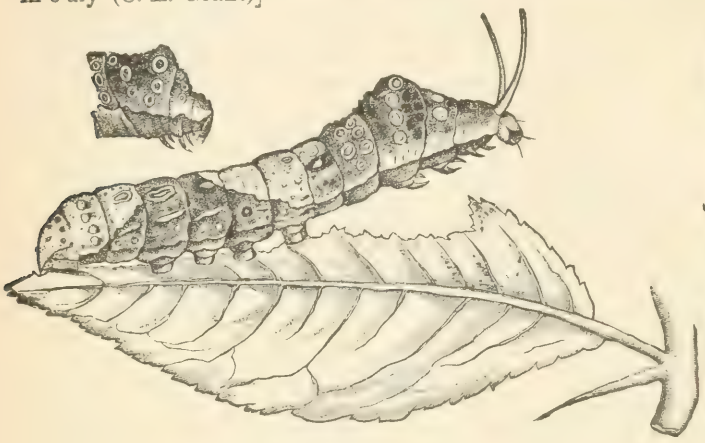

Fig. 101.

Fig. 102

104. Pyrgus Tessellata, *Scud.*—This rare butterfly, Fig. 103, which has only been recorded in Canada as having been taken in Essex County, Ontario, many years ago, was taken in the early part of October, 1895, by Mr. Anderson, at London, Ont.

Fi 103.

106.—Nisoniades Brizo, *Boisd.-Lec.*—Orillia, scarce (C. E. Grant).

107. Nisoniades Icelus, *Lint.*—Orillia, not uncommon in May, June and July (C. E. Grant).

108. Nisoniades Lucilius, *Lint.*—Orillia, scarce C. E. Grant).

109. Nisoniades Juvenalis, *Fabr.*—Sudbury (J. D. Evans); Orillia, not uncommon in May and June (C. E. Grant).

112. Pholisora Catullus, *Fabr.*—Orillia, rare, June (C. E. Grant).

114. Eudamus Pylades, *Scud.*—Port Hope, abundant in sunny places in the woods during the first two weeks of June, 1896; Orillia, abundant at the end of May and in June (C. E. Grant).

## OBITUARY.

### John M. Denton.

It is with profound regret that we record the death of our old friend and highly esteemed colleague Mr. John M. Denton, of London, Ontario, who was one of the early members of the Entomological Society and always took a very lively interest in its welfare. For some months he had been in poor health owing to an affection of the liver, but was able to attend his place of business from time to time and to take part in the proceedings of our annual meeting in November 1895, when many of us saw him for the last time. In January, his illness assumed a more acute form and confined him to the house. On Tuesday, March 24th, he was seized with paralysis and before midnight passed peacefully away.

Mr. Denton was born in Northampton, England, on the 19th of September, 1829. His father was a farmer by occupation, and he was consequently brought up in the country amidst rural scenes and learnt there to love and observe the beauties of nature. At the age of fourteen he was apprenticed to a woollen draper and tailor, and spent seven years in thoroughly learning the trade and becoming proficient in all its details. For a few years he was engaged in business on his own account, and in 1855 married Miss Ann Walker, of Somersetshire, England, who survives him. He then emigrated to Canada and settled in London and at once resumed his occupation as a tailor, having but little to begin upon, except a hopeful heart and a thoroughly practical English training. By patient industry, unfailing courtesy and unswerving integrity, he built up by degrees a most successful business as a merchant tailor, and won the respect and esteem of the whole community.

Living on a farm in his boyhood and apprenticed at so early an age, he had but little opportunity of acquiring a literary education, but by constant application and careful reading he overcame these disadvantages, and attained a more than ordinary knowledge of the subjects that interested him. Foremost among these was Entomology, which he studied especially in its economic aspects as affecting live stock, fruit trees, garden and field crops. He became an authority on these topics and was frequently called upon to address meetings of farmers and fruit growers and give them the benefit of his knowledge and experience. His love of the farm continued throughout his life and he devoted much of the time that he could spare from business to the cultivation of a fruit farm a few miles from London. He was no mean authority upon horses and cattle and had a considerable knowledge of their diseases and most satisfactory treatment. He was also an adept with the microscope and took great delight in searching into the hidden beauties of nature.

When the London branch of the Entomological Society was formed in July, 1864, he was one of the original members, and took a most active interest in it and the parent Society to the close of his life. He was elected Vice-President of the London branch in 1872, and President in 1878 and several years following. In 1871, he became a member of the Council of the parent Society and continued to hold office for five and twenty years; in 1892 he was elected Vice-President, but he would never allow himself to be nominated for the Presidency, though urged to do so more than once. He was also an active member of the Ontario Fruit Growers' Association and gave much assistance to its work.

He was a man of deep religious feelings and of earnest but unobtrusive piety. Though a leader of the Plymouth Brethren, he never obtruded his views upon those who differed from him. The writer knew him well for a great number of years, and during his visits to London often enjoyed his hospitality, but never did he hear a word fall from his lips that could wound in the slightest degree the susceptibilities of those who did not accept the theological opinions that were so dear to him. He was a good, honest, sterling man, whom all respected and whom his friends loved; kind, charitable and generous; courteous in manner, most hospitable in his home, above reproach in business; a man who is a distinct loss to the city in which he lived, and whose death creates a blank in the hearts of his friends which can never in this life be filled. To his childless, sorrowing widow we tender our deepest, sincerest sympathy.

C. J. S. B.

### Captain J. Gamble Geddes.

It is our painful duty to record the loss of another active member of the Entomological Society of Ontario. A 2 o'clock on Good Friday morning, April the 3rd, Captain J. Gamble Geddes died after a few days' illness brought on by a severe cold. He was born in Montreal in 1850 and educated there. When a young man he entered the service of the Molsons Bank and was for some time attached to the office in London. He at once joined the Society and became an enthusiastic member. In 1874 he was elected Secretary-Treasurer of the London Branch; in 1875 Vice-President; and in 1876 Presi-

dent. He left London on his appointment as Manager of the agency of Molsons Bank at Millbrook. Here living in the country he devoted most of his leisure time to the collection and study of insects, applying himself especially to the Lepidoptera. In 1880 he left the bank and was appointed aide-de camp and private secretary to the Hon. John Beverley Robinson during his term of office as Lieutenant-Governor of Ontario. Being fond of society, of handsome presence and devoted to music, he became a great favourite among the social circles of Toronto, among whom much of his time was accordingly spent. He did not, however, abandon the pursuit of Entomology, but succeeded by correspondence and exchange, in addition to the captures of his own net, in forming a large and valuable collection of butterflies from all parts of the world. This he subsequently sold to the Dominion Government and it now forms the nucleus of the collection in the Geological Museum at Ottawa. He made expeditions in 1883 and 1884 to Manitoba and the Northwest Territories as far as the Rocky Mountains in quest of butterflies and added much to the knowledge of their geographical distribution and habits. On several occasions he visited England, and spent some time in Germany, and also in Bermuda. Wherever he went he made the acquaintance of the leading Entomologists and added to his stock of knowledge.

His first contribution to the *Canadian Entomologist* was in 1874, when he wrote No. 14 of a series of articles on "Some Common Insects"—"The Common Cockchafer," C. E vol. vi. p. 67. His subsequent papers were the following: "List of Diurnal Lepidoptera collected in the Northwest Territories and the Rocky Mountains in 1883," C. E. xv., 221; xvi., 56, 224; xvii, 120; one hundred and twenty six species were enumerated.

"Euptoieta Claudia," C. E. xvii., 60 (1885).

"Notes on three small collections of Diurnal Lepidoptera made in 1886." (These were made in Newfoundland, the Kamanistiquia River, Lake Superior, and Hudson Straits.) [C. E. xviii., 204.

"Some notes on the genera Colias and Argynnis whilst alive in the imago state," C. E. xix., 166 and 230 (1887).

"Notes for collectors visiting the Prairies and Rocky Mountains," C E. xxi., 57 (1889).

"Colias Chione," C. E. xxi, 59.

He also contributed the following articles to the Annual Reports of the Society:—

"Some remarkable captures in Ontario," 18th Report, 1877, p. 21.

"On some of the collections in England and the German Empire," 22nd Report, 1891, p. 31.

"Insects collected in Bermuda during the winter of 1894," 25th Report, 1894, p. 25.

In addition to his love for Entomology, he took a great interest in philatelics, and formed a large and valuable collection of postage stamps. He was an accomplished musician and usually sang in the choir of the church that he attended; he was also a member of the Philharmonic Society of Toronto. He belonged to the Masonic Order, in politics was a strong Conservative, and in religion a member of the Church of England. His wife, who was a daughter of the late Edward C Jones, of Toronto, died a little more than a year ago. The untimely death of Captain Geddes was no doubt hastened by her loss. They have left two little orphan girls, aged three and five years respectively.

The writer, who knew him intimately from his boyhood, deeply deplores his loss, and his grief is shared in by a very large circle of relatives and friends.

C. J. S. B.

### Miss G. E. Ormerod.

It is with deep regret that we record the death of Miss Georgiana Elizabeth Ormerod, of Torrington House, St. Alban's England, the elder sister of Miss Eleanor A. Ormerod, whose name as a distinguished Entomologist is known throughout the scientific world. After several months' of patiently borne illness, she passed away on the 19th of August

last, full of piety and good works, and justly esteemed and loved by all who knew her. She and her sister were each other's constant companions and fellow workers, and each sought the other's counsel and aid in carrying out any plan of work in which she was engaged. Miss G. E. Ormerod's special studies were botany and conchology, and in the latter department she formed a large and valuable collection of shells which she presented a few years ago, to the Natural History Museum at Huddersfield. She was highly gifted as a linguist, and acquired an excellent knowledge of French, Italian, Spanish and German, and was thus enabled to be of the greatest assistance to her sister in correspondence and the translation of foreign works of science. She is most widely known, however, by her remarkable talents as an artist, which were employed in the illustration of her sister's works, and in the production of a splendid series of diagrams in which are depicted a large number of the most important injurious insects in all their life-stages.

In addition to her scientific and artistic work she devoted much of her time and means to benevolent objects, and carried out for many years at her own expense a system of distributing books of an entertaining and instructive character amongst the working classes.

Women of such a type are rare, and we cannot but deeply deplore the loss of this eminent Christian lady, who died at an advanced age, full of good works, performed in a most unobtrusive manner; richly endowed with intellectual and artistic talents which she largely used for the benefit of others; always happy and cheerful in her daily domestic life; kind, hospitable and sympathetic: ready to help all who deserved her aid, and to give wise counsels to those who sought them from her.

To her sister—her life-long colleague—the loss is beyond what words can express. We can only venture to offer to her our heart-felt sympathy and our earnest wish that she may have grace and strength to endure so heavy a blow.

C. J. S. B.

## ENTOMOLOGICAL LITERATURE.

The Gypsy Moth.—A report of the work of destroying the insect in the Commonwealth of Massachusetts, together with an account of its history and habits both in Massachusetts and Europe. By E. H. Forbush and C. H. Fernald.

This report, a handsome volume of nearly 600 pages, well printed and most copiously illustrated with chromolithographs, photogravures and wood cuts, gives a full account of the introduction of the now notorious "Gypsy Moth" into America by Leopold Trouvelot in 1868 or 1869, traces its history, and records the efforts which have been made to exterminate it by the State of Massachusetts up to the end of 1895. The spread of this insect for the first ten years was remarkably slow in the light of what we now know of its capabilities for harm. During that period it was not noticed by anyone but the introducer. The first extensive outbreak was in 1889, but for ten years before that it had given great annoyance to the people living in the part of the town of Medford, where it was first introduced. It had also spread and had gained a foothold in thirty townships without attracting public attention. Since that time its history is well known. In 1890 the first Gypsy Moth Commission was appointed and the work of fighting the pest was inaugurated. In February of the next year this commission was removed and another one substituted. On 12th of March Mr. E. H. Forbush, the present very efficient "Director of field work," was appointed, and on 18th June Prof. C. H. Fernald began his labors as entomological adviser. Since that time the work has been pushed on with great energy and the present valuable report is an outcome of the combined efforts of a practical, energetic manager and a careful, scientific entomologist. The two parts of this report prepared by the above named officers are quite distinct and form together a very complete treatise, not only upon the Gypsy moth, but upon the general principles which it is necessary to study when combatting any injurious insect. This carefully prepared report, therefore, cannot but be for a long time an indispensable book of reference for economic entomologists.

There are in this volume many things which will attract the attention of entomologists. Indeed, it is so full and there are so many different subjects treated of, that even to give the titles would take more space than is at my disposal. The first thing which will be noticed is the adoption of the generic name *Porthetria*. Articles of particular note deal with the studies made as to the methods of distribution of the Gypsy moth and the measures practised for the destruction of the insect in its different stages; spraying apparatus, and particularly the care of spraying machinery; methods of pruning, and some charming observations upon insect-eating birds.

The scientific work contained in Professor Fernald's report is of great value and contains a record of most painstaking and patient work. Probably one of the most interesting sections is that which deals with Natural Enemies, in which most excellent work has been done. Prof. Fernald has been aided in this work by efficient assistants, and the whole information so gained has been pieced together by a master hand.

With regard to spraying, some surprising results have been obtained. In the first place the caterpillar of the Gypsy moth seems to be little affected by applications of Paris green when applied of the strength ordinarily used for other mandibulate insects. Mr. Forbush says: "It became evident before the end of the season of 1891 that spraying, while reducing the numbers of the moth, could not be relied upon as a means of extermination, for many caterpillars survived its effects."

The following conclusion on page 139 will show entomologists that the matter of controlling mandibulate insects, by means of active poisons, is still a fertile field for careful work, in which useful and laurel-bearing results are still to be reaped:

"Every effort was made during the spraying season to determine why the results of spraying were not uniform and satisfactory. The feeding caterpillars were watched day and night by many observers. The spraying was most carefully superintended and the conclusion finally arrived at was that, under ordinary conditions, spraying with Paris green for the Gypsy moth was ineffective and unsatisfactory."

Paris green was on the whole the most fatal insecticide, and when used in the proportion of one pound to 150 gals. of water did not burn foliage, but with larger proportions did considerable harm. The injury developed so rapidly that within a short time the leaves were all killed and the surviving larvæ had to go elsewhere to feed. "Therefore, a strong Paris green mixture had little better effect than a weak one. Lime was then used with the Paris green with a view of neutralizing the burning, but considerable injury to the foliage still continued."

Probably one of the most remarkable facts discovered by the entomologists is related by Professor Fernald on page 476, where he says: "One interesting result obtained from the analysis of the different stages of the Gypsy moth, made in 1893 and 1894, is that pupæ and imagoes from caterpillars which have been reared on leaves sprayed with Paris green or arsenate of lead, may contain arsenic in recognizable quantities. Several pupæ and a few female imagoes obtained under these conditions, when subjected to chemical analysis gave ample evidence of the presence of arsenic in their bodies. This shows that the presence of arsenic in the pupa may not materially interfere with the processes involved in the development of the imago. Since, as has been repeatedly demonstrated, moths reared from poisoned larvæ are capable of reproduction, it is also evident that the arsenic contained in their bodies does not injure the reproductive function."

With reference to the amount of arsenic which could be consumed by some of these caterpillars, and yet leave them "normally active and healthy," it was found that some of them had in their bodies in proportion to their weight, an amount equivalent to 12½ times the fatal dose for an adult human being, in proportion to the weight of the latter.

The work of the Gypsy Moth Committee has been criticized, examined and studied by practical men who were entomolgists and others who were not. As far as I can learn, the general verdict is that excellent work, and, under the circumstances, remarkably so, has been done. The insect is not exterminated, it is true; but there seems every reason to hope, judging from what has been done and the behaviour of the species in other countries

where it was once alarmingly abundant, that this is possible, if money is supplied and if it is given at the time when it can be made use of to the best advantage. On pages 38 to 93 of the report will be found an instructive account of the constant efforts of the Committee to get funds to carry on the work properly, and year after year it was the same story of reduced, and what was almost worse, delayed appropriations, resulting in the necessity of modifying the whole plan of work arranged for the year, so that instead of making vigorous efforts for the extermination of the insect, and fighting it at the time this could be most effectively done—early in the season, when the caterpillars were small—all that could be done was to try and prevent the further spread of the enemy from the localities known to be infested. The appropriations which have been made for this work are considerable, about $525,000 up to the present time, and this amount would certainly have produced far better results, could the Committee have obtained the grants at the time they required them, so that they could have begun the work early in the season and continued employing, from year to year, those assistants who had been taught, at an expense of much time and trouble, what was required of them. J. F.

Report of Observations of Injurious Insects and Common Farm Pests During the Year 1895, with Methods of Prevention and Remedy. Nineteenth Report, by Eleanor A. Ormerod, F. R. Met. Soc., etc.

This splendid report fully sustains the high standard of excellence which has characterized Miss Ormerod's previous publications. The preface shows that the unusual and prolonged low temperature of the winter of 1894-95 had apparently but little affected the insects which it might be supposed to destroy.

The following pests are treated of in separate chapters: Apple, *Smerinthus ocellatus;* bean, *Bruchus rufimanus* and *B. fabæ*; cabbage, *Ceutorhynchus sulcicollis*; corn and grass, *Charæas graminis, Cetonia aurata, Phyllopertha horticola, Melolontha vulgaris, Rhizotrogus solstitialis, Tipula maculosa* and *Oscinis frit*; gooseberry, *Bryobia prætiosa, B ribis* and *Nematus ribesii*; mangolds, *Aphis rumicis, Silpha opaca* and *Atomaria linearis*; orchard caterpillars, *Cheimatobia brumata*; pine, *Astynomus ædilis* and *Retinia buoliana*; plum, *Scolytus rugulosus*; strawberry, *Harpalus ruficornis, Pterostichus madidus* and *P. vulgaris*; turnip, *Helophorus rugosus.*

The ravages of the bean weevil appear to have been serious, and those of the ground beetles, upon the strawberry, have been more extensive than in previous years. Ninety-three pages are occupied with the discussion of the above mentioned insects, while fifty are allotted to "Flies injurious to horses, cattle," etc. These chapters are exceedingly interesting, and several species of Hippoboscidæ, Tabanidæ, and Œstridæ, which are very annoying and injurious to domestic animals, are fully and clearly discussed. In connection with the account of the attacks of the Forest Fly, *Hippobosca equina*, are given two magnificent plates showing upper and side views of the foot of this fly, the tarsi of which are so modified as to enable it to secure a most firm grip on the hairs of the animal upon which it alights. The report concludes with a chapter on Deer and Dog Ticks, very troublesome mites belonging to the Ixodidæ. W. H. H.

British Butterflies, by J. W. Tutt, F.E.S., London: George Gill & Sons, 1896. Pp. 469. (Price 5s.)

It is only a few months since we spoke in terms of commendation of Mr. Tutt's Manual of the British Moths, and now we have before us an even better work on the butterflies by the same industrious author. About one-fourth of the book is taken up with the general subject, presenting a series of chapters on the four life stages of butterflies, their variation and its causes, hibernation and æstivation, classification, collecting, arranging and preserving specimens, and the inflation of larvæ. These are written in the author's pleasant, easy style, with which his previous works have made us familiar, and convey much information of interest to butterfly-hunters everywhere. We are glad to observe that he insists very strongly upon the importance of labelling specimens with the place and date of capture, though the English mode of using short pins and setting the specimens low down makes this a matter of difficulty.

The descriptive portion of the work is excellent and much more complete than that of any manual of British butterflies that we have met with. In the case of each species there are given the English and scientific names, reference to the plate where it is figured, synonymy and bibliography, a concise description of the imago, a paragraph on "variation" in which are mentioned any known aberrations, forms of varieties, as well as sexual distinctions, descriptions of the egg, larva, pupa, notes on the time of appearance, habitat and geographical distribution. Thus it will be seen that proper regard is paid to the whole life history of the insect and that the author does not confine his attention to the imago alone. The plates (uncolored) on which each species is depicted are admirable, and should enable any collector to identify his specimens without difficulty; there are also a considerable number of wood cuts throughout the text.

In the arrangement of species the author begins with the "lowest"—the Skippers, Hesperidæ—and proceeds upwards to the Satyridæ, among which he strangely places "the Purple Emperor," *Apatura iris*. His classification, a thorny subject which we do not propose to discuss here, may thus be considered fully "up to date."

To our readers in the British Isles and to those who have collections of British butterflies, we heartily commend this excellent manual. We only hope that it may not be very long before we have some hand-book equally good dealing with the butterflies of Canada.—C. J. S. B.

Preliminary Notes on the Orthoptera of Nova Scotia, by Harry Piers. Transactions of the N. S. Institute of Science, vol. ix., 1896.

So little attention is paid to Entomology in the Maritime Provinces that we gladly welcome this contribution to the subject and are much pleased that Mr. Piers intends to devote some years to the study of the order Orthoptera. The paper before us gives some very interesting notes on the habits and range of fourteen common species of cockroaches, crickets and locusts, and describes more at length the ravages committed by *Melanoplus atlanis* on Sable Island, a hundred miles off the coast of Nova Scotia in the Atlantic Ocean.—C. J. S. B.

Insect Life.—A short account of the classification and habits of insects, by F. V. Theobald, M.A., F.E.S.. London: Methuen & Co. Pp. 235. (2s. 6d.)

Under the title of the "University Extension Series" the publishers are issuing a number of books on historical, literary and scientific subjects, which are intended to be both popular and scholarly. We have not seen any of the other works of the series and cannot, therefore, comment upon them, but the book before us seems hardly to come up to the expectations one would naturally form of a manual intended for use in preparation for "University Extension" lectures. The descriptive portion is meagre and will afford a student a very vague idea of the insects belonging to the different orders. It is satisfactory, however, to find in an English publication some attention paid to Economic Entomology and the application of the insecticides, which are in common use here. The book is neatly printed (though we have noticed several misprints in the spelling of names) and is illustrated with over fifty wood cuts.—C. J. S. B.

Critical Review of the Sesiidæ found in America north of Mexico, by William Beutenmüller, pp. 111-148, Bull. Am. Mus. Nat. Hist, VIII., 1896.

The writer of the present brief notice of this excellent paper on the *Sesiidæ* desires to call attention to the very careful work of Beutenmüller on the clear-wings and the necessity for this work which has arisen from the uncritical publications of preceding authors. It appears, for instance, that our *S. lustrans*, a species well distinguished by antennal peculiarities, has been five times the subject of new descriptions by the late Mr. Hy. Edwards, whose species are very properly reduced, as appears from Beutenmüller's studies. The name hitherto used for this species itself must, it seems, give way to *bassiformis*, Walk., described from a type in poor condition. Beutenmuller

is quite correct in calling attention to the particular necessity in this group for good material from which to describe. The want, perhaps, of such material led Mr. Edwards to describe *S. rutilans* six times over. A large number of sexual determinations by Mr. Edwards are corrected by Mr. Beutenmuller, so it seems hardly possible for anyone to have worked with less judgment. The list of the clear-wings in the New York Check List was drawn up, with the rest of the list, by the writer of the present lines, who at the time merely sent the last proof to the late Mr. Hy. Edwards for his revision. Mr. Edwards added, in explanation, the two foot notes on page 12 and signed these, and made one or two changes in his names for genera on page 11. The writer is also responsible for the list of the clear-wings, since he originally wrote the same, and not Mr. Edwards. The explanation is here given, as the list has been erroneously alluded to as the work of Mr. Edwards. In the Philadelphia list the New York list is generally copied, but *lustrans* is wrongly given to Mr. Hy. Edwards, and an implication is conveyed in the preface that Mr. Hy. Edwards was the author of the lists of the clear-wings, which is here corrected. The writer trusts that Mr. Beutenmuller will continue his studies and that lepidopterists generally will help him in every possible manner. It is a matter of great satisfaction that Mr. Beutenmuller's timely work is also of such good quality. The writer would merely reclaim his *Sesia pictipes*, which is also given to Mr. Hy. Edwards, on p. 134, and draw attention to the excellent description of the habits of this species given by the late Dr. Bailey in the pages of the American Entomologist.

A. Radcliffe Grote, A. M.

A List of the Butterflies of Sumatra, with special reference to the species occurring in the north-east of the Island. By L. de Nicéville and Hofrath Dr. L. Martin. Calcutta. Reprinted from the Journal of the Asiatic Society of Bengal, 1895.

This list of seven hundred and fifty-six species of butterflies taken in a limited portion only of the great Island of Sumatra, gives one some idea of the wealth of the insect fauna in tropical regions. In a very interesting introduction the authors give a brief description of the Island, which is nearly as large as France and is bisected by the equator, and relate the difficulties that have to be surmounted in the formation of a a collection of its butterflies, which can only be effected by employing natives, who have first to be taught and trained for the purpose. Dr. Martin lived for thirteen years on the Island and has thus been enabled to add very interesting notes on the distribution, scarcity or rarity, habits, season of occurrence, etc., of a large number of species. One may, therefore, open the list anywhere and find not a mere record of names, but highly interesting details regarding the butterflies. As might naturally be expected, the preparatory stages of the majority of the species are as yet unknown.

C. J. S. B.

A List of the Butterflies of Sikhim, by Lionel de Nicéville, F. E. S., etc. Calcutta: from the Gazetteer of Sikhim. Printed at the Bengal Secretariat Press.

Probably no part of the great British Empire of India and its tributary States has been so fully explored by the collectors of butterflies as the country of Sikhim, which includes the famous health resort of Darjeeling, about 7,000 feet above the sea, on the slopes of the Eastern Himalayas. Consequently the author is able to record in this list no less than six hundred and thirty-one species, which he considers a near approach to the maximum number that can be discovered. Certainly it is a goodly number, and one hard to be realized by a dweller in these northern and much less luxuriant regions. And what splendid creatures they are, with their gorgeous colouring and infinite variety of shapes and hues. Nearly fifty species of Papilios alone are recorded, and more than one hundred and fifty Lycænidæ, the greater number of which belong to genera that are entirely unknown to us here.

C. J. S. B.

Monograph of the Bombycine Moths of America North of Mexico, including their transformations and origin of the larval markings and armature. Part I., family 1, Notodontidæ By Alpheus S. Packard. National Academy of Sciences, Vol. VII., 1895 (received May 11th, 1896); 292 pages, 49 plates, and 10 maps.

Dr. Packard's long promised monograph has at length appeared. The copious text is divided into ten sections: I., Introduction; II., Hints on the mode of evolution of the bristles, spines, and tubercles of Notodontian and other caterpillars; III., On certain points in the external anatomy of Bombycine larvæ; IV., On the incongruence between the larval and adult characters of Notodontians; V., Inheritance of characters acquired during the lifetime of Lepidopterous larvæ; VI., Geographical distribution of the American Notodontidæ; VII., Phylogeny of the Lepidoptera; VIII., Attempt at a new classification of the Lepidoptera; IX., A rational nomenclature of the veins of the wings of insects, especially of the Lepidoptera; X., Systematic revision of the Notodontidæ, with special reference to their transformations.

Most of these have previously appeared as separate articles, as the reader will recall. The life-histories are given as fully as our present knowledge will allow, much of this knowledge being due to Dr. Packard's own labours. The plates illustrating them are beautifully coloured, the early stages highly magnified. These plates must be seen to be appreciated.

A few remarks in criticism of the memoir will not be understood to imply a lack of appreciation of its many valuable features In general the synoptic tables of subfamilies, genera, and species are poor and uncritical. They are no improvement over those of the author's monograph of Geometridæ, to which the same criticism applies. In all the figures of larvæ the setæ are imperfectly shown, and their number and position are not to be relied upon. I corrected for Dr. Packard a number of the plates in this respect, but the corrections were necessarily made from memory and on general principles, and there is not a figure which has the authority of a careful copy from nature. Even the special figures in the text are often grossly erroneous: *e. g.*, figure 9, on page 63, where the back and side views of the same larva are shown as different. Dr. Packard also fails generally to describe the arrangement of the setæ in the text.

The classification of the Lepidoptera which is used is original with the author. It has been already presented in the *American Naturalist*, where I have had occasion to notice it. In rejecting the classification of Prof. Comstock, the author argues that the frenulum is of small value in classification, because both frenulum and jugum are present in some Jugatæ, and the frenulum is absent in some Frenatæ While we may admit this argument for what it is worth, it seems that Dr. Packard entirely misses the great cumulative force of the evidence adduced by Prof. Comstock and others for these suborders. Classifications founded on the venation alone [Hampson], the wing scales [Kellogg], and the antennæ [Bodine] give the same suborders. I have also shown that the larval characters do not support Dr. Packard's view. But Dr. Packard gives no weight to larval characters, in spite of the implication in the title.

Harrison G. Dyar.

Missouri Botanical Garden. Seventh Annual Report, 1896.

Very few reports are more eagerly looked for every year by those who are lucky enough to secure copies than Prof. Trelease's report on the Missouri Botanical Garden and the Henry Shaw School of Botany at St. Louis, Mo. This report contains not only the Director's annual statement on the condition of the Garden and its finances, but also valuable monographs on different genera of plants. In the present volume we find the following: I. *The Juglandaceæ of the United States*, by Prof. Trelease: II. *A Study of the Agaves of the United States*, by A. Isabel Mulford, and III. *The Ligulate Wolffias of the United States*, by C. H. Thompson. A feature of all these annual reports is the magnificent illustrations.

In addition to the above, there is the report of a speech delivered at the sixth annual banquet, by President Henry Wade Rogers, of the North-west University, on The Value

of a Study of Botany, and a catalogue of the "Sturtevant Prelinnean Library" the greater part of which was presented to the Botanical Garden by Dr. E. Lewis Sturtevant in 1892.

One very notable omission from the present volume which we much regret is the printing of the Annual Flower Sermon. Last year it was delivered by the Rt Rev. W. C. Doane, Bishop of Albany.

The first annual event provided for in his will by Henry Shaw, the good man who founded this garden for the enlightenment and happiness of his fellow men, was "The preaching of a sermon on the wisdom and goodness of God, as shown in the growth of flowers, fruits and other productions of the vegetable kingdom.". A lovely poem in prose for the perusal of which by his friends, the writer's copy of the 1893 report is in constant use, is a sermon preached by the Rev. Cameron Mann, from the text "Consider the lilies of the field." This sermon, from a literary standpoint, is charming, and certainly helps to carry out the wise wish of the benevolent founder to inculcate in all a thankful spirit for the many lovely things in the vegetable kingdom which we find strewed with no niggard hand along our walk through life, making our own journey more beautiful and, it is hoped, our friends happier from contact with us.

J. F.

Economic Entomology, for the farmer and fruit grower and for use as a text book in agricultural schools and colleges; by John B. Smith, Sc. D. Philadelphia: J. B. Lippincott Co., 1896. [Price $2.50]

It is rather remarkable, when the self-evident importance of the science of Economic Entomology is considered, that until Prof. Smith issued his excellent manual, which has just appeared under the above title, there was no one American book which a farmer could consult to find the names and proper remedies for the common crop pests which would come regularly before him in a year's working of his land. The author in his long experience first as a member of the staff of the "United States Entomologist at Washington, and subsequently as State Entomologist of New Jersey," has had great opportunities of becoming thoroughly informed on his subject. That he has made the best use of these opportunities, is evidenced by the excellent book which he has now produced. The best way to test anything is to use it. Thus if anyone wishes for information upon anything within the limits of Economic Entomology, the subject of Prof. Smith's book, as, for instance, some one of the regularly occurring insect enemies of crops, *e. g.*, cut-worms, white grubs, canker worms, the Colorado potato beetle, plum curculio or tussock moth, etc., let him turn it up in the index of this work and he will be referred to a clear and concise account of the insect and its habits, together with recommendations as to the best remedies. The identification of the different species is made easy by a profusion of remarkably good illustrations. The whole book, including the index, consists of 481 pages, while the number of illustrations is no less than 483, all of which are unexceptionable if a mental reservation may be allowed as to the three plates of Bumble-bees and Bee flies Nos. 398, 464, and 473, taken evidently from photographs. It seems a pity that these plates should have been included in this work on Economic Entomology. The arrangement of the book, for ease of reference, is well planned and well carried out, the objects the author had in view, as explained in the introduction, being adhered to in a most satisfactory and complete manner. Part I. consists of eight short chapters on the Structure and Classification of insects. Part II. the insect world, which forms the bulk of the book, is a systematic treatment of the various common injurious insects in their natural orders. This portion is particularly well balanced, enough space being devoted to each species treated of to satisfy the inquirer, without, as is sometimes the case, giving undue importance to some at the expense of others. Part III. treats of insecticides, preventive remedies, and machinery. This work cannot fail to prove of great value to the farmer and fruit grower, as well as to the amateur gardener and student of insect life, who will find in it an authoritative book of reference of small size but comprehensive and easy to consult.

J. F.

### Household Insects, (U.S. Bulletin No. 4. New Series)

During the year 1896 several most useful publications were issued from the United States Division of Entomology under the direction of Dr. L. O. Howard. Of particular interest to the general public was Bulletin No. 4, entitled "The Principal Household Insects of the United States." The main part of the volume is prepared by Dr. Howard and his assistant Mr. C. L. Marlatt, and at the end is a chapter by Mr. F. H. Chittenden on "Insects affecting cereals and other dry vegetable foods." To entomologists, who know the literary and scientific work of these gentlemen, it is only necessary to say that this volume is up to, or perhaps even a little above, the usual excellent standard of the papers issued from the U.S. Division of Entomology at Washington. A very few minutes' examination of the different articles in Bulletin 4 will convince anyone of the extreme value of this concise, practical treatise on all the commoner insects which are likely to be found troublesome inside houses. It is almost impossible for one who has made a specialty of entomology to speak in moderate terms of these publications. There is nothing to compare with them published in any other country. When we consider the matter treated of, and the practical way in which it is presented, the manifest care to secure accuracy of statement, the exquisite work of the artist as well as the arrangement and general get-up of the pamphlet, one is tempted to use so many superlatives that any opinion expressed might be thought to be unduly biassed.

A special feature of value in this publication is that it is entirely made up of original American observations, most of them prosecuted in the Division of Entomology, and, as is pointed out by Dr. Howard in the introduction, the very curious but not unexpected condition of affairs was shown in the preparation of this bulletin that of some of our commonest insects the life history is not known with any degree of exactness. The insects treated of are such as are found in houses and which either annoy the occupants by their direct attacks or are injurious to household goods and provisions. These are described in eight separate chapters. J. F.

### Miss Ormerod's Twentieth Annual Report, 1896.

One of the pleasantest events of the year for the economic entomologist is the arrival of Miss Ormerod's Annual Report. The liberality with which the distinguished authoress distributes these treasuries to students and public institutions all over the world brings them within the reach of all who may wish to profit by their perusal.*

It is seldom that any series of publications upon a single subject can show year after year such a steadily maintained, and even gradually increased, interest, as has been the case with these reports—new infestations of crops are being constantly investigated, old attacks restudied, and additions made to the previously recorded methods of treatment or prevention. It matters little in what part of the world a student may be located, he will always find something of value which may be profitably applied to his special work in fighting against the crop pests of his own country. The present report is no exception to the general rule. We congratulate our highly esteemed corresponding member on the practical and serviceable manner in which the subjects she treats of are presented to the public. As a writer in the *Queen* newspaper of late date says, "Miss Ormerod's work does not consist in playing with entomology, but is true, valuable, practical, scientific observation, and she enjoys the proud privilege of being regarded as one of the most reliable scientific observers."

On opening the report one is sadly reminded by the frontispiece, an excellent likeness of the late Miss Georgiana E. Ormerod, of the irreparable loss the authoress has suffered in the recent death of her much loved and highly talented sister, who has been her life long companion and able assistant in the grand work she has done for economic entomology in England. The late Miss Ormerod was a naturalist of no mean

*These reports are also for sale by the publishers, Simpkin, Marshall & Co., London, at the almost nominal price of 1s. 6d.

standing and possessed remarkable talents as an artist. She is well known as the authoress of the magnificent series of thirty colored diagrams of insects injurious to farm crops. These are thirty inches long by twenty wide, and are most suitable for use in a class room or at farmers' institute meetings. In the preface of the report the sad event referred to above is touchingly and fittingly alluded to with a reference to the obituary notice by Dr. Bethune which appeared in the *Canadian Entomologist* for November last.

Among the various short monographs contained in this report of 160 pages many are of interest to Canadian farmers and fruit-growers either from the identical species occurring both in England and Canada, or from a similarity in habits between allied forms in the two countries.

Codling Moth: This is one of the yearly recurring troubles of the fruit grower to which most of the damage to apples may be laid. English experimenters do not even yet seem to have mastered the spraying of apple trees for the prevention of injury by the codling moth. The remedies are given by Miss Ormerod as follows: "Our only really available remedies against this infestation appear to lie 1st in destroying infested apples; 2nd in trapping the caterpillars and destroying their shelters; and 3rd on being well on the alert at the time of the blossoming of the apple, and by careful spraying preventing the very beginning of the attack." In this country the recommendation for the best remedy would be: "Spray with 1 lb. Paris green and 1 lb. lime in 200 gallons of water within a week after all the blossoms have fallen."

Beet Carrion Beetle: We have occasionally in the North-West Territories a rather rare attack upon vegetables such as squashes, spinach, etc., by the larvæ of one of the carrion beetles *Silpha bituberosa*. In England a very similar species has been the cause of serious damage to mangolds, and last season when other food failed attacked potatoes. The carrion beetles feed both on vegetable and decaying animal food. It is suggested by a correspondent to attract the beetles and larvæ from the crop by putting about the infested fields "a few wild pigeons, rooks, hawks or similar *vermin*." (*Sic.*) The ignorant farmer in England, as well as in other parts of the world, "generally shoots in spring" every hawk he can see. In this country the remedy which would first suggest itself would be dusting the crop with land plaster and Paris green (50 lbs. to 1).

Leather Beetle: An interesting account is given of an attack by *Dermestes vulpinus*. Large numbers of beetles were found in a building where bones had been stored for six or nine months for the manufacture of manure, and not only the bones were honeycombed, but also the posts and floors of the building over them, which were seriously injured by the larvæ, when full-grown, boring into the wood to pupate. Reference is also given to another similar occurrence near Sheerness, in Kent, which was upon even a larger scale than the one treated of by Miss Ormerod. This article is illustrated by excellent figures of the beetle and its various stages, as well as a portion of a perforated bone and a piece of honeycombed wood.

White Cabbage Butterflies: Under the head of cabbage two species of *Pieris* are treated, and powdery dressings are recommended as fresh lime, soot and sulphur. The highly reprehensible practice of using Paris green upon cabbages is referred to, but Miss Ormerod wisely says she could not take on herself the responsibility of advising the treatment, more especially as the feeling against it might probably ruin the sale of the cabbage. There is no doubt of the truth of this last statement. There is never a season passes that instances do not come under the notice of the writer of people expressing fear of buying cabbages lest they may have been poisoned with Paris green. In addition to this the use of such a virulent poison is quite unnecessary. Pyrethrum powder mixed with three or four times its weight of common flour and kept for twenty-four hours in a tightly closed vessel is even more quickly fatal than Paris green, killing every caterpillar the powder falls upon, or upon which the infusion of the powder may run when it has been wetted by dew or rain, and further, this powder is not poisonous to the higher animals.

Croton Bug: An occurrence of this well known guest at hotels and other large buildings heated with steam, is spoken of. The usual remedies adopted in this country

as powdered borax and the many brands of pyrethrum powder are mentioned, and "stoving" with sulphur is given a prominent place under remedies.

Deer Forest Fly: For some years Miss Ormerod has made a special study of the *Hippoboscidæ* or Forest flies, and another chapter of her most interesting observations on these little-known insects is given in the present report, with excellent figures of the common Forest fly and the Deer Forest fly.

Earwigs: The injuries of earwigs in hop gardens and to mangolds, swedes and turnips, likewise to apple blossoms, have been serious in 1896. The old method of trapping the insects in inverted flower pots or tin pots containing a wisp of straw has given good results; also beating them at night on to tarred boards.

The House Fly (*Musca domestica*, L.): One of the most interesting monographs in this report, at any rate to the general public, is an account of the troubles caused by the common house fly. The life history of the insect is treated of at considerable length with quotations from the several authors who have written on the subject of "flies" and a statement as to the serious annoyance by house flies in India upon horses. Dr. Spooner Hart, V.S., of Calcutta, sent numerous specimens of a fly which was examined carefully by specialists and found to be true *Musca domestica*. He says: "March 24th. It is the worst pest the horse has here, and at this time of the year it exists in thousands especially in the suburbs. It attacks in great numbers the eyes principally, and is constantly flying off and coming back all day long to the same site. This causes great irritation and inflammation, which, being continued day after day and neglected, will lead to blindness, disfiguration of the eyes and ulceration of the face.

"Our hackney carriages (cabs) here are drawn by wretched half starved ponies fed principally on grass, out all day exposed to the sun, stabled in filthy holes and are most disgracefully treated and neglected. Dozens of these unfortunate creatures are blind from irritation set up by these flies, and present huge ulcers on either side of the face just below the eyes, the result of constant lachrymation and irritation of the flies. The eyelids are thickened and averted and the appearance is awful. The flies are dreadfully persistent, and will not be shaken off." Under the head of Prevention and Remedies it is pointed out that as house flies, as far as is actually known for certain, breed wholly in horse manure, much may be done to lessen the numbers by keeping stables clean and removing as quickly as possible all horse droppings and getting them into the land as soon as convenient. Further, as many observers believe that house flies breed also in other decaying matters it is advised to pay special attention to garbage thrown into ash pits.

With regard to the attacks of flies to horses' ears, eyes, etc., Dr. Hart writes that a carbolic wash when freshly applied will keep the flies away. Horses in India are also protected by eye fringes, made of hanging white cords which cover the eyes and prevent the flies from settling. The irritation to horses described above reminds us of the distressing accounts given by travellers in Egypt of the diseased condition of the eyes of the Egyptian beggars, particularly of babies and children, from the irritation caused by flies. The prevalence of ophthalmic troubles would suggest the frequent spread of these diseases by flies, the infection being carried from person to person.

As to the manner in which these sores are made Miss Ormerod says as follows: "Several other kinds of flies are very commonly to be found in our houses, including *Stomoxys calcitrans*, sometimes called the "stinging fly," which can give a painfully sharp prick by means of a needle-like proboscis. From these the house fly can be distinguished by its having not a sharp pricker, but a soft proboscis adapted for suction, but incapable of penetrating the skin, so that when these insects trouble man and animals it is only to imbibe their perspiration. But the various other flies which commonly pass under the name of "house flies" much resemble them in many particulars of their life-history, and speaking generally of these "flies" it is obvious that even of those which do not sting, where the foot has the "pads" covered with hundreds of hollow tubes secreting a viscid fluid by which they adhere to the smoothest surface, and the organs

used in taking food consist of minute formations called teeth by which the surface of the food is rasped, and thus new surfaces exposed to the action of the moisture of the fly's mouth, that it is not surprising that delicate parts, such as the surroundings of the eye, should suffer grievously, where, as in hot countries, they are buried under the constantly attacking masses of the pests."

Two simple devices are explained, one for catching flies, wasps, etc., out of doors in a wholesale way, the other for clearing a room in summer when flies frequently swarm into houses in annoying abundance. For the capture of flies in gardens Miss Ormerod advises the use of two square hand-lights, one set on the top of the other. The finger hole at the top of the lower one allows the flies to go up into the upper one, of which the hole is closed with moss or other material, and the lower one is raised up from the ground on bricks, with a bait of some attractive substance placed below. The flies after feeding rise up and gain access through the hole at the top to the upper light where they collect in thousands that soon die from the heat of the sun.

To keep flies out of dwelling houses Miss Ormerod tells of a plan contrived by her late sister, Miss Georgiana Ormerod. It is to close the lower sash of the window, then draw down the upper sash so as to open it about a foot at the top. Next draw down the calico rolling blind so that the flies are inclosed between the blind and the glass panes of the window, when, following their natural instinct, the flies rise, and when they arrive at the opening to the fresh air outside, out they all go.

A similar plan to the above has been practised in the dining-room of one of the hotels at Ottawa for some years, and has given great satisfaction.

Leafage Caterpillars: In this chapter several leaf-eating caterpillars are treated of, together with the well tried insecticides, Paris green and kerosene emulsion. It is evident that through Miss Ormerod's instrumentality these valuable remedies are gradually becoming better known and more generally used by English orchardists.

Mediterranean Flour Moth: We regret to read that this most injurious insect which was first noticed as mischievous in England in 1887, is now thoroughly established as a perfect pest in any roller flour mill where it once gets a footing, and also is to be found in bakeries, or the like places where the flour, on which its caterpillars feed, is present; and consequently now is in the course of unchecked spread, which has given the infestation thorough establishment. No new methods of treating the insect are spoken of; but an incidental mention is made to an important matter, *i.e.* the spoiling of flour by fumigating with sulphur, showing the necessity of knowledge and care in making use of this remedy. In Canada, even without any care on the part of millers, this infestation is of rare occurrence, the spread and increase of the insect over most of the Dominion being prevented or rendered easy of control by the low winter temperature, to which from time to time mills can be subjected.

Onion Sickness.—This attack due to the Stem Eel-worm (*Tylenchus devastatrix*) has never, so far as I am aware, been observed in Canada; but may at any time appear. The reasonable remedy proposed by Miss Ormerod should, however, be adopted for all vegetables showing disease. This is to destroy carefully by burning everything which shows a diseased growth, and on no account throw it on a manure pile to be put back again on to the land.

The Pear Lyda or Social Pear Saw-fly is of particular interest from the almost identical appearance and habits of the species with those of a Lyda found in great abundance last July in southern Manitoba on plum trees in the gardens of the Mennonites. Whole trees were seen, upon which nearly every leaf was seared and skeletonized. The foliage of large branches was frequently webbed tightly to the twigs, forming a tent containing scores of the curious false caterpillars. The remedy of spraying the trees early in June with Paris green would certainly have saved the trees.

Pear and Cherry Saw-fly (*Eriocampa limacina*).—The Pear slug every year does much harm in Canada. This is almost invariably from the fruit grower's neglect. These caterpillars can be easily controlled by spraying or dusting with Paris green.

Surface Caterpillars (the cutworms of this country) did much damage in 1896. The chief point of interest is a trial of a mixture of nitrate of soda and salt (proportions not given) hand sown after hoeing between the rows and between the roots—at the rate of about 3 cwt. per acre. The results of the trial seem to justify a further test of this remedy which at any rate would invigorate and help the remaining plants to make a vigorous growth.

Caddis Worms were troublesome in beds of watercress and did considerable damage. This plant is cultivated in shallow canals with running water and is grown in large quantities to supply the city markets. The foliage is destroyed by the encased larvæ of several species of water flies which crawl nimbly about the plants. The most successful remedy was found to be to flood the beds deeply and then disturb the Caddis worms by passing the backs of wooden rakes very thoroughly over the plants. The worms let go their hold of the plants and rise to the top of the water and are carried off down the stream past the beds.

The above brief references are merely to those articles in this valuable report which are thought to be of direct interest to us; but there are many other subjects treated which may at any time demand our attention. The great charm of Miss Ormerod's reports is that she does not theorize and when reading them there is always an overwhelming feeling of confidence that any observation or investigation recorded is put down absolutely as she saw it.

J. Fletcher.

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## The Rev. Thomas W. Fyles, F.L.S.

We have much pleasure in presenting to our readers the excellent portrait of our colleague, the Rev. Thomas W. Fyles, who has been for many years an active member of the Entomological Society of Ontario. Though living at South Quebec, he has regularly attended the annual meetings at London, travelling many hundreds of miles in order to do so, and has invariably delighted those present with his excellent papers. He was a member of the Council from 1882 to 1888, when the change in the Act of Incorporation required the directors to be resident within certain districts of the Province of Ontario. Three times he has represented the Society as their delegate to the Royal Society of Canada at Ottawa, and he has been a member of the Editing Committee of the *Canadian Entomologist* since 1889.

While filling the arduous position of Chaplain to the immigrants landing in Canada, under the auspices of the Society for Promoting Christian Knowledge, he devotes any spare moments that he can get to the study of entomology. He has succeeded, with an energy and enthusiasm worthy of admiration, in forming an extensive collection of insects and acquiring a knowledge of the science beyond what is ordinarily met with. That he may long continue to carry on his excellent work, both in his official position and in his scientific pursuits, is the hearty wish of all his friends.

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# TWENTY-EIGHTH ANNUAL REPORT

OF THE

# FRUIT-GROWERS' ASSOCIATION

# OF ONTARIO.

1896.

*(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)*

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1897.

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W. E. WELLINGTON, ESQ., TORONTO.

President Fruit Growers' Association of Ontario, 1897.

H. L. HUTT, B.S.A.

Horticulturist at the Ontario Agricultural College, Guelph.

TWENTY-EIGHTH ANNUAL REPORT

OF THE

# FRUIT GROWERS' ASSOCIATION OF ONTARIO.

*To the Honorable John Dryden, Minister of Agriculture* :

SIR,—I have the honor to present the Twenty-eighth Annual Report of the Fruit Growers' Association of Ontario. The meeting at Kingston, reported herein, was one of the most profitable in the history of our Association, and we believe it will mark a step forward in the fruit growing industry.

I have the honor to be, Sir,

Your obedient servant,

L. WOOLVERTON,

Secretary.

GRIMSBY, December, 1896.

# OFFICERS FOR 1897.

PRESIDENT—W. E. Wellington, Toronto.

VICE-PRESIDENT—W. M. Orr, Fruitland.

SECRETARY-TREASURER AND EDITOR—L. Woolverton, M. A., Grimsby.

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| Division No. 1 | Harold Jones, Maitland. |
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| Division No. 11 | T. H. Race, Mitchell. |
| Division No. 12 | Alexander McNeill, Windsor. |
| Division No. 13 | G. C. Caston, Craighurst. |

AUDITORS—A. H. Pettit, Grimsby ; George Fisher, Burlington.

COMMITTEES.

*Tariff*—W. E Wellington, M. Pettit, W. M. Orr.

*Cold Storage and Transportation*—L. Woolverton, W. M. Orr, G. E. Fisher, A. H. Pettit, E. D. Smith.

*New Fruits*—John Craig, H. L. Hutt, L. Woolverton.

*Finance*—W. M. Orr, A. M. Smith, M. Pettit.

*Executive and Program*—W. E. Wellington, W. M. Orr, L Woolverton.

*Delegate to Quebec Pomological Society*—R. B. Whyte, Ottawa.

*Representatives on Boards*—*Western Fair*, T. H. Race, Mitchell ; *Toronto Fair*, W. E. Wellington, A. H. Pettit ; *Central Fair*, R. B. Whyte, Ottawa.

# FRUIT GROWERS' ASSOCIATION OF ONTARIO.

## ANNUAL MEETING.

The annual meeting was held at Kingston, Wednesday, December 2, in the Dairy School lecture hall, the first session opening at two o'clock p.m.

The president, M. PETTIT, of Winona, expressed pleasure at seeing so many present at the opening session, which promised a good meeting, and called upon

The secretary, Mr. L. WOOLVERTON, who read a telegram from Mr. Alf. Brown, Picton, regretting his inability to be present and read his paper; from Mr. Holtermann, of Brantford, calling the attention of the Association to breach of the law forbidding spraying fruit trees while in blossom by some fruit growers. Referring to the latter, the secretary stated that this Association is fully in accord with the Bee Keepers' Association on this matter, and will use its influence in endeavoring to prevent any transgression of the law on the part of the members throughout the Province.

The secretary also read telegram from the Minister of Agriculture for the Dominion stating that he would be present on Wednesday afternoon and deliver an address; also from the same, suggesting that the Association should discuss what tariff changes are desirable; also from Mr. Lockie, of Waterloo, inviting the Association to meet in that town next year; also letters of regret from Prof. Taft, Mr. Rice and Mr. Watkins of Michigan, regretting inability of be present; also invitation from St. Catharines to hold convention there next year; also from Whitby, inviting the Association there in 1897.

The secretary read the regrets of Mr. Anthony Copp, of Hamilton, at his inability to be present. The secretary stated that Mr. Copp and Senator Sanford were ardent advocates of the establishment of a station in London, England, for Canadian fruit. The secretary, the president, and some other of the fruit growers in the district near Hamilton had the honor of putting up some boxes of choice fruit for Her Majesty Queen Victoria, some of which, as mentioned in the newspapers, had appeared on Her Majesty's table. It was thought that this would be a good means of bringing Canadian fruit prominently before the English public. A letter received from the Dominion Department of Agriculture has been received stating that the award for the exhibit of horticultural literature at the World's Fair had been received, consisting of a medal and diploma. The judges considered our exhibit of literature unique, and such as was not exhibited by any other horticultural society. This diploma is not an ordinary one, as it has engrossed upon it the reasons why our exhibit was considered meritorious, as follows: "This exhibit consists of a complete set of the reports of the Ontario Fruit Growers' Association, and it is of a very high order of merit. It illustrates the extensive and progressive work of a wonderfully successful organization."

MR. THOS. BEALL suggested that all our medals should be exhibited at the annual meetings, so that the public might see what the Association had received in time past.

THE SECRETARY: We have a set of medals received at the Centennial, and medals received at the Massachusetts Horticultural Society and other places. We shall endeavor to show them at the next meeting.

## THE PRESIDENT'S ADDRESS.

By Murray Pettit, Winona, Ontario.

Again we are permitted to meet and extend to each one that friendly greeting we owe to each other as horticulturists. All are interested in one common and grand industry, that of horticulture in all its various branches, an association less selfish than any other association, having only as our object the benefit of mankind, the building up of the Province in which we live, and the health and wealth of its people; for health is wealth. What association is to-day laboring more earnestly for this than the society of which you and I have the honor to be members, by encouraging the growing of fruits, flowers and vegetables, and ever advocating the doctrine that every land owner in this Province, no matter how small, can have a fruit, flower and vegetable garden, thereby bringing health and happiness to his family? What is more elevating to humanity than the outgrowth of our industry? What more advances the wealth of our Province than the work in which we are engaged? What to-day has placed our beloved Province more in advance of the other provinces than the fact that fruit growing has become a success in all her borders, largely through the work of this Association?

Now that every home in our land can be fully and cheaply supplied with fruit, and an abundance for export, should we not turn our attention more fully and earnestly to better means of transportation and development of markets? The abundant crop and low prices of the past season warn us of the danger of over-production When we consider the fact that hundreds, if not thousands, of acres are yet to come into bearing, this is a question of great importance to the fruit growers of the Province of Ontario. Apple culture has engaged the attention of our association, at their annual meetings, for the last thirty years, new varieties continually claiming our attention, but it would appear to me that the time has fully come when the question of transportation and the development of new markets should engage our careful consideration. While we claim to be a progressive association, and welcome the advent of new additions to the already large list of choice varieties, we might now leave their development to our fruit experiment stations, where their true value, hardiness, productiveness, and quality, as well as their adaptability as to locality and soil, might be fully tested, and not, in our ambition to secure a mine of wealth in some new and untried variety, forget that almost millions of barrels are being produced now of exceedingly fine quality, the value of which might be enormously increased could we place them upon the markets of the world in proper condition and at reasonable cost. Thousands upon thousands of barrels this year are scarcely bringing freight and commission charges in the British market, and we ask ourselves can it be possible that after subsidizing railways and steamships for the transportation of our products we are now called upon to pay the total value of the product to these companies to carry them to their destination, or does the fault lie at the other end? That part of the transaction we do not see. Reports as to the prospects that reach us are very encouraging, but returns are most discouraging. Much fault is laid at the door of the packer, but this I cannot endorse as being general. We have before us to-day an object lesson, and one we might carefully study for our future guidance. Large quantities of choice apples wasted in the orchards. "Why?" Because of doubt and uncertainty in regard to the system of marketing on the other side, and, to add to the doubt, the increase in freight rates, which are usually made when the quantity to go forward is large. Let us analyse the matter as it has stood with many a shipper this season. Freight from, say Toronto to Liverpool, $1.07½ per bbl. by the car load; insurance, say 3c per bbl.; cable charges, 1c per bbl.; receiving, delivering, and sale expenses, etc., 18c per bbl.; commission, 5 per cent., this year, on selling price of say 8s. per bbl., 10c, and he has the respectable sum of $1.40 against him. Now, out of the small balance of 52c in his favor, there is one barrel to pay for, 28c; picking, 10c; packing, 10c; cartage, well, we will only charge half what they do on the other side, because we can do it ourselves, 5c, and we will throw in small items, such as nails, postage, telegrams, stationery, etc., for the sake of doing business with those large receiving firms in the Old Country, always remembering the

special injunction to "put in only the *choicest specimens*," otherwise the slightest neglect in this regard would bring discredit upon Canadian apple growers! We want a change in the present system, and you, gentlemen, fruit growers of Ontario, will need to solve the problem. Slack, wet and wasty are convenient terms too frequently applied, unless the product is towed across like a raft behind a scow. We see in the public press and from high authority in the land that cold storage facilities for the transportation of our fruit products will be put in proper shape before the next season's crop. I sincerely hope such will be the case. But one additional link will then be necessary to make the chain perfect and establish confidence with the producer—the establishment of a depot for the handling of Canadian fruit, and by one who has some knowledge and experience in Canadian fruit culture. This I consider all important, and his return to this country at the close of the season to report to the fruit growers the conditions that exist and the possibilities of trade in the future. At present all is uncertainty and doubt. "Distance lends enchantment to the view," but when we pause and reflect that our big English brother is to-day revelling in choice Canadian apples at cost of freight and commission, or less, it does not inspire the Canadian apple grower with much respect for the present system of handling the product. Up to November 30th the quantity gone forward from this continent was about 1,000,000 barrels, or about two quarts for each family living in the market boundaries to which they have been shipped, while in Canada the probable consumption would reach one bushel or more per family, which shows an almost unlimited market under proper conditions.

Spraying experiments were again conducted by the Department of Agriculture during the past year, and we expect valuable information from the report on this work. Now, it has been practically demonstrated to the fruit growers that spraying with Bordeaux mixture is an effective remedy for all fungus diseases. We think a careful system of experiments should be conducted, either in a similar way or by the Fruit Experiment Stations, for destroying the Codling Moth. Great improvements have been made by the manufacturers of spraying outfits, and in answer to the numerous enquiries continually being made as to which spray pump is the most suitable for general use, the Board of Control of the Fruit Experiment Stations of Ontario decided to invite a public trial of spray pumps, which was held last April, at Grimsby. Eleven pumps were exhibited, each being required to use one barrel of the Bordeaux mixture. The pumps and their work was judged by H. L. Hutt and your President on a scale of points as follows:

1. Ease of operation. 2. Evenness of distribution. 3. Compactness of style. 4. Durability. 5. Power. 6. Agitator. 7. Accessories.

The judges, in their award, class the pumps in three groups; group one standing as follows:

Spramotor, London, Ontario.

Eclipse, Benton Harbor, Michigan.

Anderson, Aylmer Iron Works.

Pomona, Seneca Falls, New York.

Medals and diplomas have been received, awarded on fruit at the World's Columbian Exhibition to districts and societies in different parts of Ontario. At the suggestion of the Honorable Minister of Agriculture, Mr. Dryden, these awards will be placed on exhibition and kept in the Parliament Buildings, Toronto, showing the great achievements of the fruit growers of Ontario. This arrangement we consider much better than having them buried in the private houses of the presidents and secretaries of the different societies. I would suggest that they be placed on exhibition each year, for a few years, in the Horticultural Department of the Industrial Exhibition, Toronto. It is a matter for regret that fifteen individual awards, after this long delay, have not been received.

Fruit experiment stations have been established during the past year, making ten in all, covering every section pretty fully, and, in a few years, the fruit growers of this Province should receive from them a great deal of valuable information. We think the

work of these stations should not be confined to experiments in varieties alone. Careful experiments should be conducted with the different fertilizers for a term of years from the time the trees or vines are planted. Also experiments in pruning, cultivation, spraying, and, in fact, everything that would tend to lessen the cost of production of fruit.

Through the patriotism of Mr. Anthony Copp, of Hamilton, the fruit growers of that section sent a collection of fruit to Her Majesty the Queen. Unfortunately it was not thought of early enough to send a good collection of summer fruit. Twenty-nine cases were forwarded to the Canadian High Commissioner, Sir Donald Smith, consisting of about fifteen varieties of apples, half-a-dozen of grapes, a few pears and quinces, and the following reply was received :

LONDON, November 21.

The Canadian High Commissioner received the following note from the Queen's Private Secretary, Lieutenant-Colonel Sir Arthur J. Bigge, dated Windsor Castle : "I am commanded by the Queen to beg you to be good enough to arrange that Her Majesty's best thanks be conveyed to those fruit growers in the neighborhood of Hamilton, Ontario, who kindly offered, through you, for Her Majesty's acceptance, a beautiful consignment of their year's crop, which the Queen is glad to hear has been unusually large and excellent in quality. The cases were received yesterday by the Master of the Household, and their contents were in excellent condition, and some of the fruit served at Her Majesty's table proved excellent."

## HORTICULTURAL REMINISCENCES

By C. E. WOOLVERTON, GRIMSBY.

[This paper was read by the Secretary, who stated that his father had been asked to read this paper because he was one of only two or three living representatives of the Association as first formed about the year 1860, and he was one of the constituent members at its organization.]

Truths of revelation, facts in science and art, development of mind and matter, are the right of no particular class, but are designed to be free for all. Therefore, every man ought to gather and distribute what he can for the well-being of his fellows, and for the progress of his country. He should learn from the running river, and not from the stagnant pool, which breeds miasma in all directions; from the merry rill, which gathers from many other streams, meanders through the meadow, swells in the vale, turns the mill, and bears on its bosom the ships laden with commerce to the broad ocean. Thus good men have travelled and collected knowledge of laws and art to bring home, and show their own people how to use soil and climate to better advantage. Pope said : "The fur that warms the monarch warmed the bear," and how much more may it be said of Mother Earth that she warms and feeds the rich and poor. God, who planted the first garden on the virgin earth, seemed to select from the fields the trees and vines, indicating that horticulture was of a higher grade than agriculture. The proverb, "Prepare the cage before you catch the bird," is verified in that God prepared the garden before he gave man a wife. Solomon said, "I made me gardens and orchards," and he reigned in peace when every man sat under his own vine and fig tree, using the plowshare and pruning hook instead of the sword and spear, and it seems as though the people would be more happy than the Athenians who spent their time in inquiring "What news?" Each savage owns the forest, but has no garden. The sluggard sleeps and neglects his garden, while the thorn and the thistle grow broader and higher. The cultivated garden indicates civilized man ; here he may show a refined taste in fruit and flowers. England, by her position and sovereignity of the sea, has not only selected the best of all lands, but has also cultivated in peace the richest of them, and to us she may well be called the Mother Country, while the German speaks in similar terms of his "fatherland."

In the time of the Revolution some sterling men called U. E. Loyalists, settled in the Niagara District. King George gave them land in the wilds of Canada where nuts, plums and crab apples grew. They had read that one of the finest trees in Rhode Island sprang from a seed dropped in the grave of Roger Williams, so many tried the experiment of sowing apple seeds, but few apples of any size were produced, and the small ones were often gathered with the wooden scoop. About 1790 John Smith offered his right to 200 acres of land for a cow, but found no buyer: about 1798 he sold it to Jonathan Woolverton, my grandfather, for 40 pounds of York currency, and the said Smith gave five natural apple trees to bind the bargain. About the year 1830 there came a man from England, about fifty years of age and weighing about fourteen stone, and he called himself Peasley, the Grafter. He carried with him scions which he said would bear pound apples, full sixteen ounces to the pound. When at work he took his stand on a wooden chair, clothed in a huge jacket with pockets like the pouches of the kangaroo, in one of which he carried wax and scions and in the other grafting tools. After grafting in our neighborhood, he returned to the Mother Country, and after six years came out again. I remember his joy when he found his word true and saw the pound apple which he said was the Gloria Mundi. I thought of old Santa Claus with his grey whiskers and loud laugh: and "his little round belly that shook when he laughed like a bowl full of jelly." He hailed from England, but his port and bearing were of the German order. He came out in the reign of George III., and when he swore, it was "Py George," the then popular oath of the U. E. Loyalist: for the king gave them their farms, their government and their church: and that they might not fracture the third commandment, allowed them to swear by his name. He brought the Ribston Pippin, Pearmain, and English Russet. When Peasley's Pearmain, Ribston and Gloria Mundi began to bear, I took a load to Hamilton and supplied that village where Cary kept hotel and Stinson the principal store.

Dr. Beadle was selling trees from St. Catharines, and one Moore, a Canadian, brought a few pears and peaches from Rochester. Delos Beadle had graduated from the Grantham Academy and, I think, was studying law at Harvard. He afterwards took up his father's calling, and at his instigation the fruit growers met in the Chief Magistrate's room in the Court House at St. Catharines. About 1857 A. M. Smith appeared on the scene. He had learned the nursery business with Mr. E. Moody, of Lockport. Mr. Moody came over for Canadian evergreen trees, he stopped at Grimsby to give us some advice about raising peaches. He praised our soil and said he had only one objection to living in Canada and that was that then he could never be president of the United States.

When our Association met at St. Catharines, we were twice surprised. First, at the knowledge of Judge Campbell and Delos Beadle about fruit, climate, and soil, and secondly, at our own ignorance of the fruit we had handled for a term of years. The genesis of our Association budded in St. Catharines. Judge Campbell was the first life member, but did not live to see it bloom. Delos Beadle was the Moses of our exodus, leading us out of our ignorance into the present fruit-bearing stage.

The formal organization of our Association elected W. H. Mills, of Hamilton, as president. He was not of the mills of which it takes ten to make one cent, nor was he a wind mill to crack corn, but he honored the goddess Pomona by cultivating fruit and flowers, and at one of our meetings took us out to see how faithfully he raised the finest plums and pears by the sweat of his brow.

Charles Arnold had rather a set countenance and appeared somewhat cross, and he believed in cross fertilization of fruit and grain, but his crossness was something like the chestnut burr, only on the outside, for we never had a more welcome visit than at his residence when he invited the Association to Paris.

A. M. Smith and the writer were honored with a like visit at Grimsby, when we followed suit and invited the Association to our hearts and homes. I cannot forget the two who brought their wives to add to the sociability of the occasion, Mr. Holton and Mr. Hoskins of Hamilton. It seemed at once to put a link in the chain of friendship which death alone could sever, and that only for a time.

In conclusion I may say that I have had the honor of being a full private member of this Association all these years, and have seen with pleasure its rise and progress to its present character, and the assistance it received from such noble men as Rev. Mr. Burnett, Wm. Saunders, Judge Logie, P. C. Dempsey and others. And I wonder why I, who have done so little to advance the work, should still live at nearly four score, while these useful men, younger than I, have been called away. But we bless their names for their works which follow them, and we hope to meet

"On the other side of Jordan
In the sweet fields of Eden,
Where the tree of life is blooming,"

where the eternal tree of life bears everlasting fruit, instead of temporary trees bearing perishable fruit only once a year.

## GARDENING IN RELATION TO CIVILIZATION.

By Prof. Short, of Queen's University, Kingston.

When I was asked to contribute a paper or address to this Association I felt, of course, extremely flattered, but I felt also that I had really nothing that was worth contributing to gentlemen who were so well acquainted with the practical aspects of gardening, fruit culture, and so on, and I was therefore at a loss to know on what subject I might address the Association; but being a lover of gardens and a reader of history and a student of civilization, I thought that possibly I might select something which would enable me to approach you more in my own line. Therefore I thought that possibly I might throw some suggestions before you of a historic nature, dealing with the relation of gardening to the progress of civilization. I may take as the text of my remarks the statement by that eminent philosopher, noted scientist, great statesman—and, I am sorry to add, great political boodler—Lord Bacon, once Chancellor of England. He said, in one of his inimitable essays: "God Almighty first planted a garden, and indeed it is one of the purest of human pleasures. It refreshes the spirits of men, and without it, buildings and palaces would be but mere gross handiwork; and a man shall ever see that when nations grow to civility and elegancy, man comes to build stately sooner than to garden finely, as if gardening were the greater perfection." And indeed the remainder of this essay is an extremely good illustration of this fact; for while it expresses the science of the new development in gardening of the Elizabethan period, yet it does not express that perfection of gardening which the architecture of that period expressed in the stately mansions which were then rising all over the fair British land. But although I shall return to that period as an extremely interesting one in the history of gardening, let me briefly refer to some of the earlier stages. Now, civilization is something which, in its origin, is shared by the few. The great mass of men in the early stages know little or nothing of the forces which are leading them on. They know only that which interests them immediately, but not the final outcome of that, nor the bearing of it on their future development. Only kings and princes, slave-masters and so on, know or have a glimmering of what is meant: and those are the men in ancient times who build palaces, plant gardens, rear fancy animals, and in general lead the lines of civilization. Later on, when we find an aristocracy rising, we find these men surrounded by others who are equally interested in such things, and who become the patrons of art and the leaders of civilization: and the great merchants and the great traders and politicians, and so on, come to be the leaders of humanity and carry on the progress of man. And then, of course, when we come down to our modern times, and begin to recognize what democracy means, and the spread of this thing abroad, these things come to be shared by the common man; and it is one of the chief features of congratulation of our modern civilization that it has carried forth to the common man, to the ordinary citizen, the opportunities and privileges of civilization: that he can now have a

garden of his own, especially on this side the Atlantic, and that he may rear in that garden things which would have been the despair of kings and princes in former centuries. We find from ancient history that the Persians were among the first to develop a great civilization, and they were among the first to develop gardening. I refer to the Persians in particular because from them western Europe, through Greece and Rome, obtained the chief flowers and fruits which were familiar in that part of the world from the time of the Persians down to almost the present century. England, as I shall point out afterwards, has been one of the leaders in developing the condition of horticulture, agriculture, and everything else, beyond that point. We read in Xenophon, for instance, that the great Cyrus in his journeyings about was careful to have a paradise, that is, a garden, established at the various places where he made his permanent or semi-permanent residences: and those gardens were furnished with pears and plums and peaches and apricots and things of that kind, which came to be the favorite and permanent fruits of Europe. They were also supplied by the various kinds of vines and climbers, the rose, the violet, the iris, different kinds of lilies, and a few other flowers; but the range was extremely limited when compared with the enormous range of the present day. I need hardly refer to the contribution of Egypt, which was very considerable, towards the development of agriculture and horticulture, too, in the growth of flowers, because, so far as it seems to have had an influence in developing Europe, it came after the Romans had conquered it; and although there was a good deal of fruit grown in many of the districts by the Phœnicians, still they do not seem, so far as any records we have or that I have been able to discover, at any rate, to have carried with them much of their gardening operations. The Greeks, who obtained most of their arts from the east, and who seem to have developed gardening along the Persian line first, were very particular in arranging their gardens artistically. In other words, the Greeks put a polish on gardening as they did upon literature, art and philosophy, and brought it to a much higher perfection than it had ever enjoyed before; and that they must have used forcing green-houses or something of that kind, is quite evident from the fact that we find in commercial records of Greece that flowers such as violets were sold in abundance in the Athenian markets in mid-winter; but just how they managed to produce them is not quite certain. When Rome came to swallow up Greece, and to sit at the feet of her Greek slaves for learning and knowledge and so on, Rome brought with them from Greece a knowledge of gardening; and the Romans, in their own sumptuous and gorgeous manner, with the pillage of the world, you might say, at their feet, went into gardening on a extremely grand and extensive scale. They incorporated into it, for perhaps the first time, an extensive architectural element, and a great feature of the Roman garden was its architecture, its fountains, its terraces up on the hills, the cascades, the immense plazas, stairways, balustrades—and all of these ornamented with the most expensive and delicate and often artistic statuary. Some remnants of those ancient Roman gardens are still to be found. Up on the hills, where the wealthy Romans had their country houses, and—most astonishing of all—out over that malarial district around Rome, through which the Appian Way passes—a place which was originally an extensive and malarial and poisonous marsh, but which the Romans, from the remains which are discovered there to-day, evidently converted into a suburb containing the richest, most expensive and elaborate palaces that the world has ever seen, in proportion to the ability and the extent of the people. These palaces were each surrounded by beautiful gardens: and the Romans managed in some way to control the malarial features of that region, and to convert the rich alluvial tract into a garden capable of producing the finest fruits and the finest flowers. But the Romans, like a good many other people who become suddenly rich—who are sent out, say, as poor governors to distant provinces and come home laden with spoils which were not all honestly obtained—went to work to expand these by means of their riches, and therefore there crept in a very extensive element of vulgarity, and the consequence was that they began to imitate nature, or rather, try to make nature imitate art. They built artificial mountains and artificial terraces, canals, and all sorts of things out on the plain territory, and thus led nature captive, as it were, after the ideal of human art. I hasten on now to the period succeeding Rome. It is an extremely interesting thing to go into the details of Roman garden and fruit growing, and so on: but I want to refer to that

which brings us most nearly to England, and that is the period of the next great development after the fall and decay of Rome That was obtained in what is known as the Renaissance; but the Renaisscence only brought to life again the fragments of Roman civilization which had been maintained in the monasteries awaiting the period of the decay of Rome and the beginning of an extensive civilization on the new basis. The church, the dignitaries of the church, and especially the monastic institutions, kept within themselves these fragments of civilization, of literature, of science, of art, and so on, and among them the element of gardening; for they retained that method and system which was the science of the Romans, and also spread over Europe the trees, shrubs and plants which the Romans had obtained from Greece, and the Greeks from the Persians Now, the Renaissance generally was simply a period in which the seeds—these fragments, these ideas that had been husbanded and kept—burst forth from the monasteries once more were taken up by the common people, and extended with extreme rapidity over the country. But I should hardly say common people: they extended quite to the common people, because the masses did not change very much in this period, and that is one reason why it was so short-lived—this blossoming of the gardens of Italy during the Renaissance period, particularly those supported by the great houses of the Medici and others of those who lived around Florence and Pisa and Milan, and so on. Those were the wonder of the world: and in no respect did that remarkable development of art find a higher or more beautiful expression than in those magnificent gardens; and one of the finest things about them was their extreme artistic effect—because some of them, in a somewhat dilapidated and fragmentary condition, remain to this day, and may be seen as exhibiting the finest features of artistic combination of architecture with gardening. From northern Italy this love for art and letters and statesmanship and so on, and with it gardening—though, as Bacon says, always after it, the finer, more delicate process, apparently—swept over the western part of Europe: was taken up by France first; from France spread to the Low Countries; then to Germany and to Spain, and so on—because Spain had really at an earlier time shared in the magnificence of Rome to a greater extent than the other countries of Europe; and from France and Holland it passed to England, mainly at the time of the Tudors, and found its first magnificent expression in the reign of Elizabeth after the troubles which had attended the Reformation in England had calmed down. Before this period in England there had been gardens; but they had been small affairs, confined to the castles within the moats, because although England began to expand in the time of the early Edwards beyond their castles a little, yet the Wars of the Roses and the troubles with France shut them up again, and the consequence was that nobility, civilization, letters and everything of that kind was walled in by those great castles, and placed in situations which were favorable for military defence rather than for the development of civilization. This is why it is that there was little opportunity for the development of gardening in England until the time of Elizabeth; but in the time of Elizabeth the gardens and the houses and so on crept out from those moated castles and strong walls and began to spread over the beautiful valleys and hills and country of England; and in no part of the world could they have found, with the facilities then at hand, a more beautiful region in which to expand themselves. Now, the first development of that gardening in England of which this essay of Bacon's from which I first quoted is one of the finest expressions, is characterized by two features distinguished by the sources from which they came. The people of Holland, according to their national proclivities, seem to have gone in for the cultivation of bulbs and bulbous flowers, in a somewhat formal manner, and everything was made after the fashion of tarts, mud pies and that sort of thing, and everything to this day has been characterized by extreme formality, dreadful in design, and unattractive in delicate matters, rather than presenting a broad and fine effect. In France we have another national characteristic expressing itself in their gardens—the love of display, of spread, of art in the formal rather than in the natural form, and the consequent development of architecture as an essential feature—the last crude expressions of which you have in the magnificent waste of lands in the Garden of Brussels—because there you have, as an English writer very well expresses it, an immense attempt to garden a whole township, as it were, and the consequence is that you lose all the effect which is obtained from this idea carried out

on a small scale—as though a man were to attempt to build a cottage of the size of Windsor Castle. Well, England took over these two features, because her commerce and intercourse were with France and with Holland; and the consequence is that the gardens of that period represent a sort of combination of those two elements: and also they run in two different lines, that is, some of them following the Holland idea, or the Dutch idea, and some of them following the French idea. Not, however, till the seventeenth century did they begin to develop some of the ideas of their own, and then during the eighteenth century they began that conflict which is continuing to this day in England and America—the conflict between the formal garden and the free garden, as they are called. This conflict comes down to the present time. Now, just a word or two about the nature of that, because that is perhaps the only practical outcome of what I have to say. The question upon which this strife turns is the question as to what the merit and use of a garden is—and here I am speaking of a garden particularly from its artistic point of view, not so much from the point of view of utilitarianism, although I cannot see any reason why you should call the production of fruits and vegetables which supply the physical and lower wants of man as any more practical than the presentation in a garden of the higher artistic features which supply, in far greater degree and in far greater prominence, the highest aspects of man. Surely that is as practical as the other: and it is that with which I wish to close in making a few general remarks. The point with the formal gardeners was this: that unless you train nature down into set and definite ways, and trim your hedges and flowers and so on, and trees, into ornamental shapes—pyramids, columns, even into the figures of animals and birds and that sort of thing—you are not really improving on nature, and you are not making nature express the highest possible amount of artistic effect of which it is capable. The free gardener, on the other hand, claims that unless you leave nature to follow her own sweet way, and simply enable her to do so to the greatest possible extent, you are not realizing the highest artistic effect. Now, it seems to me that there is a compromise, or at least meaning in this. Each one, to my mind, expresses a half truth, and it consists in this: that certainly with reference to the cultivation of flowers and trees and so on, and their arrangement, we are after the essence of natural beauty; but nature, in this as in other respects, in other forms of art, does not express to us, or turn out to us, in concrete shape, all the phases of her natural beauty altogether: and I am not such an ardent admirer of nature in the abstract as to believe that nature is always beautiful, because I have seen some things in nature that if one were confronted wish them for a very long time would simply have a tendency to drive one mad. Therefore I believe that the extracting of the beauty from nature consists in taking the beautiful phases of nature and bringing these as closely and in as great variety within human ken and within human influence as possible. Now, in so far I agree perfectly with the idea of the free gardeners, that nature's principles, not man's principles of art, must lie at the basis of gardening, and that all man can do is simply to coax nature, to systematize and to arrange nature, but to give nature in the arrangement perfect freedom, and added opportunity if possible, to expand herself in color, in shape, in shade, and all that sort of thing; and from the fact that man has himself been produced, as it were, and grown up in the face of nature, so the earth shows to man, when it is cultivated wild, a natural thing and not an artificial thing; and we should therefore go to those who have lived in the presence of nature, and not to those whose ancestors had been born and brought up in cities for generations, to find what are the principles of gardening art. On the other hand, the houses and buildings about which these gardens are to be arranged are expressions of architectural art—a wholly different art, resting on natural principles of course, the natural principles of physics, of dynamics, and the conditions and the laws of gravity, and the nature of material, and so on That is the fundamental element in architecture, and none of these must be violated without destroying all the after effects of architecture. Given these, the next range of elements that must be respected are human comfort, human convenience, the purpose for which the structure is constructed, whether it be municipal, state or domestic. Now, the last element in architecture is the ornamentation; but the ornamentation must not obliterate, contradict, or infringe upon any of these other requirements, but simply supplement them, beautify and render more perfect the fundamental elements as

they come upwards. Now, the garden is to surround these structures. The structure itself obeys these hard and fast architectural and stringent laws; and the garden is of the freedom of nature, you see—but there must be something to make the transition from the one to the other. The consequence is that it is an absolutely necessary principle that some compromise must be made in the immediate neighborhood of your building: that is, that the elements of gardening—borders and walks and shrubbery and so on, in the immediate vicinity of the house—must conform to the laws of architecture, and must therefore take on a more or less formal element, but the further it recedes from that, the more freedom it can be given, until in the outskirts it is given most absolute freedom. And thus we get what I take to be the most perfect and reasonable adjustment of the two conditions. But nature being able to present us with such an immense variety—a variety which in the species and genera of plants which are now placed at our disposal by the discoveries of men in all the different parts of the world, and the enormous facilities for transportation which enable us to bring them from all corners of the world, and to understand their conditions, and so on—enables us in the same area, with a little care and adjustment, to produce all varieties and kinds of plants, or at least an immense range of them, taking your glass houses as well as your open-air gardens: and the consequence is that if you set out with the formal idea of gardening—such an idea as will put them all in one place, in one square—it is quite obvious that you cannot cultivate any more than are suited to that one spot. But, given the variety of soil and situation and plant, and so on, it does not follow that our gardens must be on the same principle or plan, but you may get in the same city an immense development of loveliness, as it were, and love of beauty, and understanding of nature. But when we come to our public parks—and here is where the difficulty comes in—the architectural element has vanished, unless, indeed, there are architectural structures in it; and the nonsensical element in most public parks is the fact that people insist on treating the flowers of the parks in precisely the same way as you would treat the beds nearest to the house, and these go in for top-airy work and all sorts of nick-nacks and a carpet garden such as finds extreme expression, and an immense waste of means and labor, to the utter vitiation of the public taste. Don't believe that when a man comes along and opens his mouth in wide astonishment at some latest production of carpet gardening, and some monstrosity that is causing nature to imitate some form of human device, that that man is being benefitted. Not at all. He is opening his mouth with the same sort of sentiment and feeling that a man has on looking at a two-headed calf or any other freak of nature. Here is something that excites curiosity, but is rather degrading than elevating; and that man is not helped in the slightest by what he sees there, to go forth and appreciate nature, but he is helped much in the opposite way, and he goes forth and he looks on nature outside and he says, "Oh, it's rough, its miserable, it's not well kept, it's not well combed or curried," or something of that kind; and he goes back and gazes on that extreme formality and childish work. If, then, our civic gardeners and our municipal gardeners generally and others could be brought to see this difference, and the realm in which the two elements work, we might have much greater beauty in this country and in other countries than we have; and I believe the few suggestions I have made may not be out of place in that line. (Hearty applause.)

Mr. Hutt, of the O. A. C., Guelph: I am sorry I came in late, but I have enjoyed very much what I have heard of the address. There are a number of ideas brought out with great benefit in our city and town parks. I was pleased with the park in Kingston, where they have been letting nature have full swing, or assisting nature so as to produce a fine effect. Great good would result if farmers and fruit growers gave more attention to this subject. We cannot go into the country without seeing the great lack of attention paid to landscape gardening and the beautifying of our surroundings. No one has a better opportunity than a farmer to beautify his surroundings, as he has plenty of room for it. They often make the mistakes of having some fancy little flower beds instead of green sod or tastefully arranged trees, and the flower-beds are not seen much farther than the house windows. I was struck with the professor's idea of the conformity of the landscape immediately surrounding the buildings to the buildings themselves. We see

around country houses a fence that would make a good chicken yard if put in some other place, and these unsightly fences go a long way towards spoiling the appearance of the house. (Applause).

The SECRETARY: I do not see why all our fruit growers particularly cannot make their surroundings very attractive, somewhat after the suggestions made by Prof. Short. They are always planting trees and orchards around their places, but too often they set them off one side and fence them in by themselves when they might be made an extension of the surroundings of the house. They would form a good addition to the house-yard, and the land and garden surrounding the house might gradually unite with the orchards which surround them, and not be shut off by those palings or tight board fences we often see.

## FERTILIZATION OF FRUIT TREES, AND SOME CAUSES OF FAILURE.

BY PROF. FOWLER, OF QUEEN'S UNIVERSITY, KINGSTON.

The professor first showed a model or diagram of flower, and described its parts, calyx, corolla, stamens, anthers, pollen, pistil, ovary, etc. The stigma, he explained, is without epidermis and always moist, the only part of the organism which exposes living tissue. After describing its action and the effect upon it of external agents, he described the process of fertilization, and said:

To understand or explain the process of fertilization we must notice that the pollen grains of different plants are of different forms and of different sizes. So distinct are they that any one accustomed to examine them carefully can tell at a glance the kind of plant to which any specimens of pollen grains that may be presented to him belong. The grains may be smooth, rough, dotted, covered with prickles, ridges, etc., and they may be dry or moist, attached to each other, or light and separate. Each grain is covered with two coats or membranes, the outer coat being perforated with one or more pores or openings. In the pollen of wheat there is one pore, in the Evening Primrose there are three, and in some plants the number reaches eight. When a pollen grain is placed in water, especially if the water is sweetened, it swells by the absorption of the liquid; its membranes expand and the internal one protrudes through pores in the outer one. (A diagram was shown in illustration). When one of those grains is placed on the moist surface of the stigma, it absorbs moisture and begins to expand, the interior membrane gradually pushes its way through one or two of the pores in the interior coating in the forms of delicate tubes which lengthen by degrees and penetrate the substance of the pistil. Each tube elongates and grows by absorbing nourishment for the pistil and insinuates itself into cellular tissue of the style, and traversing its whole length, penetrates the ovary and comes into contact with the ovules or young seeds. Each ovule possesses a small opening (the micropyle), through which the pollen tube passes till it reaches the embryo sac, into which its contents or a part of them containing germinative cells pass and produce the effect which is called fertilization. In many cases a few hours or days are sufficient for the pollen tube to reach the ovule, but in some plants months are required. The ovule now acquires a new character and begins to grow.

In some cases the ovules may grow and attain the size of seeds without being fertilized, but they have within them no living germ and are incapable of independent life and growth. Unless they receive the germinative cell from the pollen tube they soon wither and die. This point I wish specially to emphasize, that without the action of the pollen, no seed would set and no fruit be produced.

Our next point is how does the pollen reach the stigma? (The professor here illustrated the difficulty on the diagrams.)

The botanists of the last century and the first sixty years of the present one held the belief that the adjustments in flowers possessing stamens and pistils were such on the whole as to secure the application of the pollen to the stamens of its own pistil. It was

acknowledged that great difficulties were encountered when efforts were made to explain the process by which the pollen reached the stigma, but the fact that the two organs, stamens and pistils, existed in such close proximity, and the further fact that the stigmas were fertilized by the pollen generally, silenced all doubts about the matter. In 1862 the view that every flower was fertilized in its own pollen was completely disproved. It is now held that a few flowers are so fertilized, but that the great majority are cross fertilized. There are structural arrangements in most flowers that absolutely prevent close fertilization. (1) As examples we have poplars, willows, etc., which have their stamens or male flowers on one tree, and their pistils or female flowers on another. This necessitates transference of the pollen from the one plant to the other, as without this no fruit or seed would be produced. (2) Again most of our forest trees, oaks, elms, birches, beeches, hickory, hazels, etc., have the male flowers on one part of the plant, and the female flowers on a different part. The Indian corn has the male flowers at the summit of the stem and the female flowers near the base. (3) Again in very many plants the male flowers mature their pollen before the female flowers are in a receptive condition, or on the other hand the female flowers ripen first and the staminate a few days after. In each of these cases the pollen must be carried in some way from the stamenate flower where it is produced to the pistillate which is ready to receive it.

With these difficulties in the way how can the plant be fertilized? How can the pollen reach the stigma? It is a case of do or die. Nature has secured the necessary agents for the work. Of these there are two which perform the greater part of it and are constantly seen attending to the duties assigned them at the proper season. These are: (1) Winds; (2) Insects and birds. Broad lines of demarcation separate these two classes of plants. Those trusting to the wind to bring them the needful pollen require no alluring displays to attract the breezes. They have small and inconspicuous flowers, presenting no light or attractive colors; they are destitute of fragrant odors and furnish no honey to reward the visits of insects. In further adaptation for transportation by the winds, the pollen is produced in immense quantities to allow for waste. The grains are also light so as to be carried by every gentle breeze, and dry and incoherent so as not to form heavy masses or to adhere to objects which might be encountered on its journey. The pistil-tips or stigmas of these plants are also especially adapted to catching and holding the grains of pollen blown upon them, as they are divided or branched into plumes or feathers and plentifully beset with hairs or bristles. The anthers also hang out to the air and wind only when just ready to discharge their pollen, and are suspended on suddenly lengthened capillary, drooping filaments fluttering in the gentlest breeze. Most of our forest trees blossom in early spring when the weather is seldom calm and before the leaves are sufficiently developed to interfere with the scattering of the pollen. They are native to the country and adapted to its climate, and consequently they produce their flowers in the most favorable season to secure cross fertilization. All grains, such as wheat, oats, rye, barley, Indian corn and all our cultivated grasses are also wind-fertilized, but they are all foreigners and they have been introduced by man. They are natives to other lands and are adapted for a different climate and are here exposed to certain disadvantages. A few fine, calm, summer days occurring at the time when they are ready for fertilization will prevent the transportation of the pollen and the harvest will prove a failure. Again, a few foggy or rainy days at the same time will equally produce the same result. The rain will wet the grains of pollen and carry them down to the ground, where they soon perish. Near the sea coast where fogs and continued rains are frequent, wheat is a very uncertain crop. From these facts it is very easy to see that a field of wheat which is ready for fertilization during a few fine days with gentle breezes will yield an abundant harvest, while another alongside of it which is not ready till a few days later when damp or rainy weather is experienced may be a comparative failure. Complete failure, however, will seldom occur for the following reason: The process of fertilization begins at the base of the head of wheat and gradually extends upwards for several days before it is complete. In the meantime several changes of weather may occur and one part of the head may be fertilized and produce good grains, while the top or some other part may be completely empty. Another fact worthy of notice is that if

two fields of wheat alongside of each other are ready for fertilization at the same time, the pollen may be carried from the one to the other by the wind, the one field will produce pure grain, while the other may be largely crossed or hybridized.

We now come to the most interesting part of our subject, which is to show the important duties performed by insects in the process of fertilization. All plants requiring their aid display certain attraction or hang out advertisements which mean "Good entertainment for bees and butterflies free." But where free lunches are provided some advantage is expected from the treat. The most prominent attractions are (1) Brilliant and varied colors, which render them conspicuous from a distance. All flowers admired as beautiful for their red, white, blue, purple, violet, lilac or other colors, or for the varied colors arranged in lines or dots are intended to catch the eyes of the insects and secure their attention. Expanded color surfaces are conspicuous from a distance, white and yellow being often very noticeable in the twilight. The different colors are adapted to the æsthetic tastes of different classes or species of bees, butterflies and other insects. (2) Odors of various kinds and in different degrees of intensity, are also allurements inviting the attention of insects. Some plants are only fragrant in the twilight when certain moths flutter round and visit them; some emit the odor of decaying flesh and appeal successfully to the blue-bottle flies and similar carrion living insects. (3) The real attraction, however, is the nectar, the sweet liquid which most flowers produce. The bright colors and the fragrance are merely the advertisements announcing the presence of the feeding places. When the nectar is concealed in some deep and safe recess where wet cannot injure it, many plants have lines or dots upon some of their petals to point out where it may be found, and thus save their visitor's time. What advantage does the plant derive from its elaborate preparation for the furnishing of free entertainment? The answer is easily perceived. The insect carries the pollen to the spot where it is needed. The great law of vegetable life is "Get fertilized, cross-fertilized if you can," and these are some of the means by which it is obeyed. (4) Another set of adaptations is conspicuous in these entomophilous flowers. The grains of pollen are mostly moist or glutinous, or roughish or studded with projections, or strung with threads so as not to be readily dispersed in the air, but to have some slight coherence as well as capability of adhering to the head and limbs or bodies of insects. The stigma is also fitted for the reception of the pollen by roughness, moisture or glutinosity. It is also worthy of notice that the bodies of insects are covered with hairs or bristles and rough excrescences, to which the pollen grains adhere till they come in contact with the stigma which is fitted to receive them. It is true that in the realm of nature that no one liveth to himself, not even an insect.

A few examples of the need of insects at the proper time may illustrate their work and its value. Orchards and gardens may be a mass of blossom, but without the aid of nature's laborers few apples, strawberries or raspberries and absolutely no melons or cucumbers will be produced, however favorable the weather may be. For example Mr. Belt, the naturalist, tells us that in his garden at San Domingo, Nicaragua, he sowed some scarlet runner beans. The soil was good, the climate was favorable for bean life, and the scarlet runners grew and flourished, and finally blossomed abundantly, but there their career ended. They did not produce a single bean among them, simply because the right laborers were not at hand to give the requisite help to secure fertilization. The garden was a new one in the forest, the beans were foreigners and the species of bee who understood the wants of the scarlet runners was absent from the district.

When clover was sowed in Australia and New Zealand at first no seed was produced,—the busy bee was not there to fertilize the flower. Prof. Huxley used to say that the quantity of clover grown near London depended upon the number of old maids. These venerable ladies kept cats, the cats wandered round and killed the mice, the mice destroyed the bees' nests and the young bees, and the bees fertilized the clover. Our fruit trees are dependent upon the bees and any agency which lessened their numbers would be felt in the harvest. Take another case. When the young gooseberries, or what should be gooseberries, wither and drop in early spring, instead of swelling as they ought to do, it is not so much because they have been nipped, but that the frost has kept

the bees at home. A few days too cold for the bees to pursue their labors when fruits are in blossom will often account for the failure of particular kinds. A few rainy days would produce the same effect. Strawberries are altogether dependent upon bees for the perfecting of their fruit. Each berry produces from 100 to 300 seeds, and every one of these must be fertilized that fruit may become soft, fleshy and sweet. The hard spots sometimes found on strawberries with the number of little seeds crowded together are due simply to the fact that the ovules have not been fertilized, and have withered instead of growing. Apples are sometimes deformed on one side for a similar reason.

Where birds are destroyed the insects increase to such an extent, and so many varieties of them seem to make their appearance, that they totally destroy the fruits in many places. For instance, Frederick the Great of Germany was a great lover of cherries. He had some very fine cherry trees, but he found that some birds were taking the cherries. He issued orders that all the birds should be destroyed, and the birds were destroyed in the whole neighborhood. Next year he had no cherries. The year following there was no fruit; and he was compelled to acknowledge that the birds had got the better of him altogether, and at great expense he succeeded in bringing back birds which kept the insects in check. When our little birds are being killed off the insects increase everywhere, and they will increase as long as birds are being destroyed. About thirty million birds are destroyed every year in Europe in order to ornament ladies' bonnets and hats. In the island of Sicily they destroy them in enormous numbers. When the small birds of Europe want to migrate to the southern climate of Africa during the winter, Sicily furnishes them a resting place on the way across the Mediterranean. They arrive there in immense flocks. The people in Sicily know about the day when they will arrive, and they have an ingenious way of hanging up hooks that are baited with insects to catch the swallow and little birds of that kind, the result being that in some parts of Ireland at one time it was impossible to raise crops owing to the number of insects that were being developed. In some parts of France it is the same way. However, they are getting over the destruction of birds now, and the crops are in many places better than they were. Down in the southern states of America most of the birds are killed off. In the island of Jamaica they killed them off altogether; the result was that insects were brought there that were never known before. Some species of tick came over in cattle and not only destroyed the crops, but annoyed human beings exceedingly. (Applause.)

Mr. HUGGARD (Whitby): Will pollen from the plum tree pollenize the pear tree?

Prof. FOWLER: I am not sufficiently acquainted with the practical part of the subject, but I hardly think it would. If it would, the fruit would be a hybrid between the two. I think a good many of those trees will fertilize one another to a certain extent—plums and peaches and pears—and you can get a cross between them, but they don't amount to much. In a place in France the children have a region where they fertilize different kinds of fruit trees that way, and they grow a very extraordinary kind of fruit. Different fruits would be on the same tree, because they fertilize from different kinds of trees—plum and apricot and so on.

Mr. MORRIS: Can the "yellows" on a peach tree be carried from the pollen of that tree and infect a healthy tree by bees spreading the disease?

Prof. FOWLER: I do not think that the pollen would affect it at all. I do not think that any disease would be carried by the pollen, because the pollen is newly shed on the body of the bee. The pollen sticks to the body of the bee, and he gets it from the anther where it is produced, and he lays it down on the stigma of the next plant that he visits, and I do not think there is any carrying of disease in that way, though I cannot be positive.

Mr. MORRIS: It is my firm belief that it is spreading in that way.

Prof. FOWLER: It would not be by means of the pollen; it would be by the germs of the disease getting on to the bee from that plant.

The SECRETARY: The question would be whether the little bacillus, the microbe, of that disease could exist in the pollen.

Prof. FOWLER: I hardly think it would, but I have not the practical knowledge to decide the question.

Mr. BURRELL (St. Catharines): I understood you to say that the strawberries depend almost altogether on the bees?

Prof. FOWLER: Yes, different kinds of bees.

Mr BURRELL: I keep bees, and I have noticed very few of the ordinary honey bee, and very few of the humble bee ever fertilizing. Do not a large number of those syrphus flies fertilize?

Prof. FOWLER: Yes.

Mr. BURRELL: I see Prof. Erwin Smith is beginning to doubt the bee theory although it is very plausible. Anyway, we know that yellows is on the increase, and it has been decided that the axe and the fire are the only ways of curing it. On hearing that story of Frederick the Great we will all regret that he hadn't a spray pump.

Mr. CASTON (Craighurst): I watched very closely one year and did not see a single honey bee fertilizing; but I believe the bee that fertilizes strawberries is one smaller than the honey bee—I do not know the name of it.

Prof. FOWLER: Strawberries are native to this country, and were here long before honey bees were here, so that it is a native bee that must fertilize it.

Mr. CASTON: Yes, it is a native, but it is not what we call the wild humble bee nor the honey bee. It is a smaller insect that is very industrious, and that works all the time the blossoms are out.

The SECRETARY: I think we are very happily situated on this occasion by holding our meeting in the vicinity of Queen's College. We are very much indebted, I am sure, to the two gentlemen who have given us addresses, and we very much appreciate this one on cross-fertilization, because it is a line of study that we hope our more intelligent fruit growers will take up and pursue, because it is in this way that our new and valuable fruits are produced. In the history of horticulture in Canada there has been too much haphazard and chance work in the production of the excellent varieties that have originated in Ontario, with very few exceptions. We are happy to say we have had some gentlemen who have done some good work in this line, and to them we are very much indebted. I refer more particularly to Mr. Charles Arnold, of Paris, who was the originator of the Ontario—that beautiful and valuable commercial apple; and to him we are also indebted for some other valuable hybrids in other lines. I may also refer to the late P. C. Dempsey, of Trenton, to whom we are indebted for some very valuable apples and pears—notably the Trenton apple, the Dempsey pear, and others. I am glad to know there are others who are pursuing this line to a certain extent, thought not so largely as perhaps they should be. I am glad to say we have with us to-day a hybridist who is an enthusiast, although not in the line of fruit; I refer to Mr. Groff of Simcoe, who has made a special study of the canna and the gladiolus, and who is very enthusiastically devoting a large portion of his time to the production of new varieties of gladioli. Therefore I hope this very interesting and valuable paper of Prof. Fowler's may be the means of stimulating some member of our Association to do some practical work in the line of producing new fruits by cross-fertilization, by understanding more scientifically the methods of hybridization. It is very important, I am sure, that these should be produced. It is only recently that we learned how important it is that the blossom of one variety be fertilized by the pollen of another variety. We have only recently learned that some varieties of fruit will not produce much fruit unless they are fertilized by another tree; and this is explaining the trouble with some of our barren orchards. We have large orchards of Northern Spy, for instance, that have not been producing, and possibly the reason is to be found in this fact, that the Northern Spy may not be able to fertilize its own blossoms. We have large orchards of Baldwins that have not been producing, and probably this is the reason; it wants cross fertilization between the different varieties of apples. So with the different varieties of pears. It has been demonstrated that this is true with regard to pears; some varieties have been artificially pollenated with

their own pollen, and they would not produce fruit; but when they were pollenated with another variety of pear they would produce excellent fruit. We will be very glad if people are stimulated to think out along this line and work out these problems.

Mr. Groff: I am sure it is very kind of the Secretary to refer to my work, but there is really nothing for me to add. I would like to say, in referenee to the queries that have been put, that they show how limitless is the field for study and observation in natural things, and how great is the opportunity of any of the members who are here to have it said of them, as has been said of the late Mr. Fuller, "He learned from the open book of Nature, and the universities learned from him." (Applause.)

Mr. Race: I would like to ask Prof. Fowler or Mr. Groff if any hybridizer has actually seen the bee conveying the pollen—that is if they have ever seen the bee or other insect loaded with pollen and conveying it from one flower to another? I notice from a German writer that that theory has been very severely attacked. This writer says that the only service they perform is by the use of their wings as a fan to distribute pollen in times of calm, when the wind is not doing that service, and that they have never yet been seen loaded with pollen. The same writer says it cannot possibly be, without a current of wind, distributed a very great distance by those insects.

Prof. Fowler; I think there are a good many thousands of observations recorded. For instance, Baldwin, in his work on cross-fertilization, expressly tells us that he examined the bees themselves, that is, caught the different insects, examined them, and found the pollen of certain flowers on them. (Hear, hear). He has seen those insects going from one flower to another, and has written down a good deal about it; and Baldwin was an exceedingly careful observer—very few men have been more careful. Of course, he might be mistaken sometimes in conclusions. There is another book, by Mueller, on cross-fertilization, where he gives lists of the insects that he has seen, and the plants on which he has seen them, and the plants on which they arrive carrying the pollen. It is a large volume, filled with observations that he has devoted a number of years of his life to. There is a little popular book—which is not quite so reliable, however—namely, Grant Allen, on the "Colors of Flowers," showing the value of the colors to secure fertilization by means of insects. Then every work on botany, if it is of any size, has a few chapters devoted to fertilization. Both Baldwin and Mueller refer to a large number of others for special observations. There is a little book called "Spraying of Plants," published by McMillan & Co., in New York, that gives the names of the insects that affect the plants, and the plants that are fertilized, and goes on with all kinds of spraying that have ever been used in the world from the old Persian times down to the present. I think those works show conclusively—at least, I have perfect faith in those writers that have devoted years of attention to the subject—that they have seen the bees going from one plant to another; and a special point is that if a bee sets out to visit any kind of flowers, he sticks to that special species the whole day. Bees have been watched by the hour going from one plant to the other, but he always goes to a plant of the same kind as the one that he has set to. In that way he fertilizes every plant as he goes along. If he went from one plant to a different one, of course his labor would be all in vain so far as fertilization is conccerned. (Applause).

Mr. Groff: From my limited observation the theory I have formed is that the bee carries the pollen, but that the pollen is mixed on the stamen and not on the stigma, and what we call natural fertilization takes place by the contact of the pollen and the stigma. It is not transferred to the stigma by the bee.

Mr. Race: Of course I was not heterodox myself, only I wanted to see what these professors had to say on that question; I saw that it had been attacked.

Prof. Short: When visiting a few years ago at my brother-in-law's fruit farm at Winona I happened to be there at the time when the grapes were in blossom, and he remarked that quite a number of valuable grapes often did not mature well in the bunches. I asked him to show me those—I think several varieties of Moore's Early and Worden and several varieties of the Rogers, and so on, were pointed out. On examination I found that the stamens on those particular varieties were extremely small, slight and

feeble, that they contained a very small quantity of pollen, that the stem of them was short, and that they did not apparently contain much. I spent about half a day observing the matter in order to make sure that this was not the stamen in the second stages of decay. Then I went to some of the other varieties that were said to almost always bunch well, and observed that the stamens there were strong and almost always longer than the stigmas. The bees then would naturally carry more pollen and fertilize more readily in the case of those that had strong blossoms: in the case of the others, not so. My idea was that if these could be assisted artificially by taking a feather duster, working it industriously over the strong flowers, and then striking it over the weaker ones, possibly it might help the matter. I did so, and at the end of the season my brother-in-law reported that that particular part of the vineyard had bunched ever so much better than the rest. (Applause).

Mr. MORRIS: The foxtail is better than a feather duster. That is what is used in the fertilization of tomatoes under glass.

Mr. ORR: And in hot houses for grapes.

Mr. PATTISON (Grimsby): Would it not answer just as well in the matter of grapes to plant a variety with strong stamens in close juxtaposition, say alternate rows, to those that have weak ones?

Prof. SHORT: I think that would be a good idea.

Mr. ORR: That is what we do.

Mr. PATTISON: I have found in my own vineyard that several Roger varieties, if planted in alternate rows, or alternately in the rows, with a variety such as the Concord or Niagara, will bunch very much better than if planted in blocks by themselves.

## COMMITTEES.

The President appointed the following committees:

*Fruit*—Messrs. Race, Wellington and Hutt.

*Nominations*—Geo. Fisher and Mr. Race.

*Programme*—Executive Committee.

*Resolutions*—A. M. Smith, Mr. Beall and Mr. Orr.

*New Fruits*—Messrs. John Craig, H. L. Hutt and the Secretary.

The following three gentlemen were nominated by the meeting to be added to the Nominating Committee named by the President: Mr. W. H. Dempsey on motion of Mr. Wellington; Mr. W. M. Orr; on motion of Mr. Race; Mr. Scarff on motion of Mr. A. M. Smith.

Mr. WELLINGTON, on behalf of the Committee on Fruit, asked that larger accommodation be provided for the display, and this was arranged for.

## PACKING FRUIT FOR EXPORT.

The SECRETARY: I notice a gentleman present who is a prominent member of the Montreal Fruit Growers' Association, who can bring us greetings of that Society, and who is very intelligent on the subject of fruit shipping to Great Britain, and he cannot be here to-morrow. It would be very unfortunate for us to lose the opportunity of hearing from this gentleman. I refer to Mr. R. W. Shepherd, of Como, Que., near Montreal.

Mr. SHEPHERD was received with applause. He said; I am quite taken by surprise. I was kindly invited by your Secretary to attend your meeting; but I came as a listener, and came to learn. We have wonderful respect for your Society. Within the last two years we have formed a Provincial Society—the Fruit Growing and Pomological Society of the Province of Quebec, taking as our guide entirely your Ontario Society, which has been so successful that we try to imitate you in everything. (Hear, hear). I regret that Mr. Brodie of Montreal, and Mr. Dunlop the secretary, were not able to accompany me, the latter having been sent by the Commissioner of Agriculture for Quebec, to investigate the evaporating industry of New York State—which shows how our Province is going ahead. Mr. Woolverton has asked me to say something about packing. Well, that is a very big subject. I regret that I was not able to bring one of my cases that I have been using for fifteen years for exporting apples to England and the other side. It is a very convenient case, holding 196 apples, arranged in four layers, each apple being placed in a pasteboard compartment precisely as eggs are packed in cases. I believe there is a large market in London particularly for the Fameuse—you call it the Snow apple. I have seen what you call Snows about Hamilton; I think it is only a degenerate Fameuse, as far as I can understand; but I have seen as fine Fameuse grown about Owen Sound and Morrisburg, as I ever saw in the Province of Quebec. The best way to export table apples of first quality, is to pack them in boxes—not always in compartment boxes—and there should be no chance of them being bruised. I have tried this year packing them without compartments—packing them in tissue paper in layers, and the interstices packed with paper. The Army and Navy stores reported that they arrived in very good condition. The Fameuse is the apple which the Londoners wish to get. They seem to find it an extremely fine-flavored apple. I have sent at least half a dozen varieties of red apples which are considered good table apples, but they always ask for Fameuse. Now, it seems to me that there is a good future, particularly in the Province of Quebec, for the fruit growers to cultivate Fameuse; and in this section too, along the St. Lawrence, they can grow Fameuse, can't they?

Mr. BOULTER: Yes.

Mr. SHEPHERD: I think high prices can always be obtained for first-class fruit packed in a first-class way. We in Quebec are better situated for shipping Duchess to England than you are in the west, as we can pack our apples to-day and put them on board the ship to-morrow—at least I can do it, as I am only 40 miles from Montreal. The Duchess that I shipped in barrels to Edinburgh, netted me, after paying all expenses, $1.25 to $1.30.

The SECRETARY: Cold storage?

Mr. SHEPHERD: No cold storage. They were out on the ship within 48 hours after they were picked. In Glasgow the Wealthy netted me $1.80, that is deducting all charges except the barrel. In Edinburgh the Wealthy netted me $1.30. I was not as well satisfied with the firm I shipped to in Edinburgh, as I was with the Glasgow firm. I shipped a lot of No. 2 Famense to London in barrels. They averaged $1.10. I could not have got a dollar for them in Montreal. I tried the Montreal market for Duchess, and got a dollar a barrel at auction, less 10 per cent., that is 90 cents. The same apples I shipped to Liverpool netted me $1.25, so that I think we have the advantage. We have a market every year in England for our Duchess. Formerly we used to be able to sell our Duchess in baskets in Montreal and Ottawa and Quebec, but we cannot do it now. The California early fruit has driven that kind of business out of the market as far as Montreal is concerned. It strikes Montreal just about the time that our Duchess come in, and we cannot market the Duchess with profit, so that I certainly shall ship my Duchess every year to the other side.

Mr. BOULTER: Until the California fruit is kept out of Montreal.

Mr. SHEPHERD: Of course that might make some change.

The SECRETARY: Would you do better with a case than a barrel?

Mr. SHEPHERD: I certainly don't advise packing in cases to be sold at auction, as they dispose of fruit on the other side. They allow you nothing for the extra packing

or quality of the fruit. They do not seem to like the apple-case, because in my opinion, there is no chance for waste and all sorts of things to be deducted. (Hear, hear, and laughter). But that is not the business I have gone into. I have tried it to a limited extent, but I do not intend to give the commission men on the other side the opportunity to take advantage of a good thing when they get it. (Hear, hear). The system I follow is to arrange with several firms in London or Liverpool or Glasgow, to take my cases or samples at a fixed price—and that is the only way you can do the case business. Those cases by the hundred cost 40 cents apiece, with the pasteboard interiors. I buy up the right to fill cases in the orchard, and we always calculate 2½ cases to a packed barrelful. The case holds over a bushel and less than a bushel and a half. I have three sizes of squares, three sizes of cases. My largest size square takes a large Wealthy; then the next takes a fair-sized Famense, not the largest size. The second size is the one I like to work with, and when they are turned out of the case every apple is the same size, and they are just the things that Londoners wish for their dinner table. There is no trouble about packing in cases if you can arrange your agents on the other side. I heard Mr. Woolverton or somebody speak about the necessity of having an agency on the other side.

The SECRETARY: That is to be discussed to-morrow; we have been speaking of it.

Mr. SHEPHERD: A firm has been started lately called the Canadian Produce Consignment Company, 18 St. Swithin's Lane, London. I received a letter from them the other day—they had ordered a few cases from me—in which they say: "Your apples are the only ones I have come across on this side that are packed so as to command a full value on the market." He is talking about the first-class market of London amongst the rich people who are willing to pay first-class price for a first-class article. He says further: "I have on many occasions during the time that Sir Charles Tupper was High Commissioner here, drawn his attention to the fact that Canadian produce in most cases fails to obtain a fair market price and ready sales from bad quality of packing. Unless the bulk that is shipped is equal to the early samples of shipments, the ruling price becomes the speculator's bid based on the worst samples." I had not heard of the company until I received this letter, but the gentleman at the head of it is a Canadian, and I fancy if the company is worked on the right basis it is going to be a very good thing for the fruit growers of Canada.

The SECRETARY: You did not tell us whether there was any advantage in shipping in cases, and the prices.

Mr. SHEPHERD: Not to ship to a commission man. I would not advise anybody to do it. This year 7s. 6d. was the highest I got for any case, and shipped in a small way 10 cases. The way I came to ship to these commission men was because I wished to fill up the freight space for which I have a contract with the Allans, and thus secure the special freight rate. 7s. 6d. is not enough to pay for fruit in cases—the expense is too great. About 10s. a case would pay very well; but 7s. 6d. is the highest I got this year from commission men.

Mr. BURREL: Are you satisfied with the case-packing system?

Mr. SHEPHERD: I am satisfied that for delicate fruit like Fameuse it is the only way to put them in first-class condition on the other side. You cannot put them into a barrel. I don't care how carefully you pack that barrel, when you press down the head you must press every apple to a greater or less extent, and when the Fameuse has been bruised it will rot when exposed and in a few weeks they will be all gone; but going in cases they are carried without any bruising. My brother, who resides in Surrey, wrote me last year that in the end of February the Fameuse he had in his boxes were just as good as he ever had in Canada.

The SECRETARY: Kept in ordinary condition?

Mr. SHEPHERD: Just kept in the carriage house outside. Of course there they had no frost; but it shows they keep as long if they are carried in good condition as they would keep here.

Mr. Geo. FISHER : Are the cases dovetailed, or nailed together ?

Mr. SHEPHERD : Just nailed together with wire nails. They hold forty-nine apples in each layer—7 apples each way.

Mr. FISHER : Do you band these boxes with hoop iron ?

Mr. SHEPHERD ? We used to employ two and one-half inch wire nails, and drive those nails home through the pine boards, and it is very difficult to open a box that is well nailed up that way,but they will do it in London—and of all places in the world I think London is the worst for dealing with goods. I made a shipment of Wealthys early in September to the Army and Navy stores, but it was three weeks from the time the ship arrived till they got them in the stores, where my contract was to deliver them ; and when they were delivered, ten per cent. of them were plundered, and the cases smashed up. Now to overcome that, I have had to put hoop iron about six inches around the corners. It is the corners they pry open, and the pine boards sometimes split.

Mr. BOULTER : How thick is this ?—planed down to half an inch ?

Mr. SHEPHERD : Yes, the covers are about half an inch. The ends are an inch If you ship to London, make your packages very secure. I have had no complaints from any other port, either about plundering or delay in delivery. I understand that the ships have nothing to do with discharging the cargo in London. The moment they arrive they are taken charge of by the London Dock Co., and they discharge the cargo and deliver the goods.

The SECRETARY : What do you call No. 2 Fameuse ?

Mr. SHEPHERD : What is not good enough for No. 1. (Laughter). I grade my apples very finely. The first quality I take out and put into boxes ; then an eighth of an inch off an apple is an eighth of an inch too small to fit the square, so it goes as a No. 2, which is composed of imperfect fruit and smaller apples.

The SECRETARY : And yet those paid you for shipping, even this year ?

Mr. SHEPHERD : I netted $1.10 on those. We had no culls in the barrels.

Mr. CASTON : It is very surprising and gratifying to me to learn that Mr. Shepherd shipped Duchess in barrels and that they arrived in England in such condition as to net $1.25 per barrel. I see the Fameuse quoted in London as the Snow apple. It is a thoroughly Canadian apple, and orginated, I understand, on the Island of Montreal.

Mr. SHEPHERD : I think you had better keep to the name " Fameuse ;" it takes better in London than " Snow." It is rather a distingué name—the " Fameuse " (the Famous)—and then it shows its origin, There is no doubt the Fameuse orginated from seed brought over from France by the early French settlers. The late Mr. Charles Gibb and myself traced that fact very clearly. There is no apple corresponding exactly with the Fameuse in France. We have a great many other relations to the Fameuse in the Province of Quebec, apples that are very nearly like it, but there is always some difference ; a great many of them are sold for Fameuse.

Mr. HUGGARD : How do you like the Wealthy as a market apple for England ?

Mr. SHEPHERD : In my experience the Wealthy does not take as well as Fameuse. They don't like the quality of the Wealthy—I have had several letters this year to that effect. It sells very well, though, and is a good-looking apple.

Mr. BOULTER : The Fameuse tree is very hardy with you down there ?

Mr. SHEPHERD : No, the Fameuse tree is not as hardy as we like. It is what we call a half-hardy tree.

Mr. BOULTER : A long-lived tree ?

Mr. SHEPHERD : Yes, but they don't live as long as we would like them to. They have orchards down there fifty or sixty years old.

Mr. Boulter: There is a tree in our county that my father brought in 1818, that had a good crop this year.

Mr. Shepherd: I made a shipment of forty cases to Sir Donald Smith in London on the 14th November. The apples had never been barrelled up, and they were in my own shed. I have my own packers, always packing the apples in the cases. They were not bruised, and were in very good condition, and no doubt carried well. The Fameuse are quite crisp and in good condition now. By packing in cases they cannot be bruised, as each apple is fitted into a square. That is the reason I prefer the squares, and to have the apples wrapped in paper and tightly squeezed. After the case is filled the apples just come even with the top of the case, then we put brown paper right over the top, and then nail the cover on, and they can't move about.

Mr. Jones said he had pressed and shipped Fameuse on the 5th or 6th November, and noticed that they offered no resistance to the apple press in placing the head, and he was afraid that by the time they arrived at their destination they would be bruised clean down to the face, but they went in the finest possible condition. They were shipped from the St. Lawrence District to Ottawa, Buffalo and Toronto.

Mr. Whyte (Ottawa): I can bear testimony to the excellence of Mr. Jones' packing. I bought a barrel of Snows, and they turned out perfect from top to bottom—the first time I ever bought a barrel and found that result. (Laughter).

Mr. Caston: This is an exceptional year, and the Snows are now as far ahead as they usually are in January. I attribute that to the hard frost about the 23rd September and the bright weather in August. All apples are about two months ahead of time this year.

## OVERPLANTING.

By F. G. H. Pattison, Grimsby.

The time has come in my opinion for us to seriously consider whether we ought not to stop planting most varieties of fruit.

For my part I think that, for the present at all events, in many lines of fruit, production is exceeding the limits of profitable consumption. No doubt it is a difficult thing to limit production, for even when we are agreed that too much fruit is being produced, it is our neighbors whom we think ought to stop; but for ourselves we will go on just a little while longer. Yet if a society were established for the destruction of other people's fruit trees how popular it would be! But although difficult, it is not impossible. It is not too much to say that if every other fruit tree, vine and bush now growing in Ontario were destroyed at once it would be vastly better for us fruit growers, and vastly better for the quality of fruit put upon home and foreign markets. The fruit trees left would receive proper attention which too often they do not get, and the fruit would bring a living price instead of being given away as it was too often this season. When plums are sold by the carload at nine cents a basket, and grapes at from five to eight cents, it is time to call a halt. In this connection I would especially call your attention to the cases of plums and grapes, for while we are undoubtedly over-planted in other fruits too, I think that the pressure is more felt in these two varieties just now. Now we heard it said that this last was an exceptional season for plums, and that the like will not occur again for many years, but I do not for a moment believe it. Possibly the same trees may not bear such a heavy crop for three or four years, but when we consider the vast number of plum trees planted but not yet bearing, we can easily come to the conclusion that this crop—heavy as it undoubtedly was—will not be a circumstance to the crop we will have say in 1898 or 1900. And yet this year many baskets brought the grower nothing, and some less than nothing. Failing some large new outlet for our crop we must be prepared to cease planting or else produce at a loss. Take the case of

grapes. For the number of vines in bearing there was not a heavy crop of grapes this season, yet prices were dreadfully low, the profits very small, in some cases *nil*, when the cost of setting out and labor, etc., of properly attending to a vineyard is taken into account. Undoubtedly of late years the home consumption of grapes has greatly increased, but it seems to me that for the present it has about reached its limit and no fresh outlet is opening up for their disposal; indeed, the French treaty, by injuring our native wine trade, has rather decreased our market, and there seems but little hope of selling our grapes to advantage on the British market, consequently when the new vineyards now planted out come into bearing our prices will be further reduced and profits will be non-existent. Now I must say that I think that this Association is somewhat to blame for the overplanting taking place in this Province, for we have gone into new districts and aroused their enthusiasm for fruit growing which has too often taken the form of wildly planting out orchards without the least enquiry whether there was not sufficient planted already or no. This has happened in many cases, and in that respect I think that this Association has been a distinct injury to fruit growers. Fruit growing enthusiasm is all very well, but unless we fruit growers look forward to being supported in an eleemosynary institution it is bad business. In short, we are cutting our own throats.

Now it may be a fine thing for the public that every available spot of ground in Ontario should be producing fruit, but from the growers' point of view it is not business. Indeed, it reminds one of what the French General said of the Balaclava charge: "*C'est magnifique, mais ce n'est pas la guerre.*"

Another great factor in the matter of overplanting is nurserymen and their agents. Fruit growers have suffered much from nurserymen—in the past from frosted and diseased and over-priced trees, not to mention the mulberry, Russian apricot, prunus Simoni and other frauds, and in the present by being induced by plausible agents to overplant by specious tales of the fabulous profits of fruit growing, which exist entirely in their imagination. These latter remarks apply mainly to farmers and others who have had no previous experience in fruit growing, and I think it is time that this Association should inform such persons that fruit growing is a business of itself, that it is already overdone, and that they had better not undertake to enter a business of which they know nothing, and are only induced to enter upon the plausible representations of agents whose only desire is to sell their trees—and after that the deluge. This Province has a close season for deer and other game and for fish; why not have a close time for fruit planting? *i.e.*, a period of some years during which no fruit trees should be planted, excepting certain of the small fruits, such as strawberries. During that period let the nurserymen turn their attention to the production of flowers, ornamental shrubs, forest trees, and of course mulberries and Russian apricots and trees of like nature. There would then be a chance for consumption to overtake production and for the grower to receive a living profit in the future, otherwise I am afraid that the term fruit grower may become synonymous with that of pauper, and that most of us will end our days in the workhouse. A few of us may survive to afford an example of the truth of Darwin's, or rather Spencer's, doctrine, of the survival of the fittest. But it will be an unpleasant process and we had better avoid it whilst we may.

Mr. Orr: I would like to ask Mr. Pattison if he considers there was a full crop of apples in Ontario this year?

Mr. Pattison: I consider there was a heavy crop in most parts of Ontario.

Mr. Orr: As far as I understand it, there was not five per cent. of a crop all through central Ontario from Cornwall to Windsor. The whole crop of plums was in the Niagara district and along Lake Huron and Erie shore. Through the greater part of Ontario there was no crop of plums.

Mr. Boulter: In central Ontario we had no plums at all. If the production in the Niagara district made the price what it was in Ontario, what would it be if we had plums?

The SECRETARY: Then it was not over-production that made them cheap?

Mr. BOULTER: No, because there is none in central Ontario.

Mr. PATTISON: If Mr. Orr's contention is true, I think it would only strengthen my case instead of weakening it.

Mr. ORR: That is what I wanted to confirm. If there was not over five per cent. production in the Province from the Quebec line to London, and if those points can produce a glut like that, what would it be if there was a heavy crop over the whole country?

Mr. FISHER: I understand that a great many of the plums were of exceedingly poor quality because of the excessive crop, and that many of them were not marketable.

Mr. ORR: For my own part we never had a better crop or finer plums.

The SECRETARY: It was not Canadian plums that blocked our market this year, but foreign fruits of other kinds.

Mr. RACE: The question might very reasonably be asked, is there an over-production of apples in Ontario? Is there a glut? From my own experience I can say that apples sent from here to Portage la Prairie cost laid down there $2.70 to $3 a barrel. It seems to me if we had reasonable freight rates to Manitoba and the great North West there should be no fear of producing too many apples in Ontario. There is not one settler in Manitoba out of twenty that can afford the luxury of apples at such a price as they now cost. The whole secret of the difficulty is the getting of the apples at a reasonable figure into the markets in the sections where they are wanted and will be consumed. Great masses of the settlers west want our apples. Many of them have not tasted an apple this year. I have had letters to that effect, and we have tried our best to send apples to our friends there but they cannot afford to pay the high prices of apples when they get there.

Mr. ORR: I do not believe there are too many apple trees planted in the country. If I were planting to-day I would very much rather plant apples than plums. I believe we have more plums planted in the country than we can possibly find market for when they all come into bearing.

Mr. PATTISON: I certainly agree with Mr. Orr that if there is any fruit we can plant largely it should be apples, because there is a large outlet for them. My paper was not intended to include apples, although in some districts some varieties of apples may be over-planted; but for those other fruits we have not an outlet, and for the present there seems no prospect of getting one.

Mr. MORRIS: Some shipments of early plums were made to Montreal from our neighborhood, and the word came back that there had been several cars of California plums that were shipped to Boston, sold by auction there, not wanted there, re-shipped to Montreal and thrown on the market, thus causing the low price for Canadian plums. These California plums are put up in very nice fancy boxes, but the quality is very inferior. The appearance takes with the people, and from reports received I believe that the cities of Canada have been glutted with the California plums, which have killed our market.

Mr. DALY: Why not ship our plums as well as our apples to the North West where they cannot produce them?

Mr. BOULTER: Very fine plums are being raised in the Okanagon Valley and a large portion of the plums in Winnipeg are British Columbia plums, and they work eastward, and we cannot successfully compete with them. I do not think we would find an outlet in Manitoba for plums on account of the enormous number of trees that have been set out and the quantities that are shipped from Vancouver east to Winnipeg.

Mr. FISHER: What are they doing in apples out there in British Columbia?

Mr. BOULTER: Well, I had a chance to verify a little what I stated last year. I was with an excursion of a thousand people at Agassiz and I saw some very nice fruit

and had the pleasure of meeting the Horticultural Society of British Columbia, and fine samples of the summer fruit were brought forward; but it bears out exactly what I say, and I will stake my reputation as a man that they will never grow a good winter apple in British Columbia outside of the Valley. The trees I saw at Agassiz are nearly all summer trees. There are points where you could grow probably a good winter apple, but I wish I could have brought home the report of the Horticultural Association of Vancouver Island, saying that after twenty years of honest, earnest endeavor to grow a good winter apple they failed. The climate around there is too moist to grow them successfully. The summer fruit was very nice. The trees on the farm look very odd. They are all grown very close to the ground—not pruned up to get the sun and air to color them. I have yet to learn where they can grow a good winter apple in British Columbia; but no finer plums and cherries can be grown on the continent of America, and strawberries and good summer and early fall apples can be grown in British Columbia. In Okanagon Valley, where Lord Aberdeen has spent so much money, he may succeed in growing hardy winter apples, but outside of that I doubt if they can be grown.

Mr. BURRELL: You don't consider the flavor of the British Columbia plums as good as Ontario?

Mr. BOULTER: They are large and more like the California.

Mr. BURRELL: All the pears and plums tend to elongation in British Columbia?

Mr. BOULTER: Yes.

Mr. BURRELL: The flavor of the fruit from Agassiz at the Toronto Exhibition was much inferior to the Ontario fruit.

A DELEGATE asked if it was likely if we would have a good crop all over Ontario in one year.

The SECRETARY: I have sent over 1,500 barrels to the old country this year and am receiving returns every fortnight or so, and the price has averaged from $1 to $1.25 and in some cases $1.50 per barrel; and I don't think we ought to be altogether discouraged and give up the business and dig out our orchards from the present full year of apple growing. It is not a very great income we get from the apple orchard at those prices, but I think we can live and produce even at those prices.

Mr. A. M. SMITH: What other farm crop, even allowing the low prices of the fruit, has paid any better than the fruit crop?

Mr. HAYCOCK: I think we can account for the over-production of plums, etc., in another way than has been advanced so far. We will have to go back a year in order to get the real cause of the over-production and the low prices of plums this year. A year ago last May there was a general frost throughout the district, and fruits of all kinds were almost totally destroyed in the western part of Canada: consequently there was no fruit last year; and this year there was not only an over-crop of plums but of every other kind of fruit—strawberries and raspberries, wild and tame, and currants and gooseberries and every kind of fruit. They, coming into competition with the plums, brought a glut in the fruit—not in plums alone, but in the same class of goods, in fruits, and the consequence was that plums and grapes, coming in rather late, the good housewives through this country had their gem jars all filled, consequently there were lower prices than you need look for again. It is hardly likely that there will be another year when there will be such a general good crop of all kinds of fruit as there has been through Ontario this year. I think that is one reason why the later fruits this year got such extremely low prices. Then the prospects of a good crop of apples prevented people from laying in a larger store of canned goods for winter.

Mr. GROFF (Simcoe): A representative of a large fruit firm in Detroit told me that during the plum season they had to keep two men busy all the time breaking the California packages and transferring them to domestic packages in order to sell them, on account of the unpopularity of California fruit. In regard to the general question, it is

just the same with the cattle market and the horse market, and these things cure themselves. You cannot order any man to stop planting or even suggest it. Individuals must be the best judge. Quality will always rule.

Prof. SHORT, of Queen's: Are farmers finding it more profitable to grow any other crops than fruit? It is quite obvious that they will go into fruit until the profits on fruit come down, and as long as the price of grain and other produce continues low the price of fruit cannot be high, unless you adopt Mr. Pattison's plan of restricting the planting. But there is another point of view—that of the consumer. (Laughter.) I wish there could have been put before this Association a fair sample of the kind of fruit that was put on the Kingston market this summer. As a regular visitor to the markets I must confess that I was lamentably deceived on quite a number of occasions this summer in purchasing what I took to be, from the aspect of it, a very fair basket of fruit, and when I arrived at home about half of it had to be thrown out, and as an individual in such cases I was discouraged from buying another basket of fruit; although if I had been successful in getting good ones I should have bought probably twice as much on account of the importance which I attach to the devouring of fruit. It seems to me that the Ontario people might take a leaf out of the California book and put up their fruit in some better order and in a shape that would guarantee that the bottom of the basket or package would be fairly in keeping with the surface of it, and the fruit would not be in such a dilapidated condition when it reaches places like Kingston, which has to depend largely on outside areas.

A DELEGATE: To what particular fruit do you refer?

Prof. SHORT: I refer to plums, peaches and grapes in particular.

Mr. JOHN STEWART, of Benmiller: I think the cause of the low prices in fruit put up for market is that it is not properly matured. I saw thousands of baskets of plums shipped from my section to London and Toronto that were not ripe and fit to handle; and I saw them sold in London for twenty-five cents a basket. I had some sold in the same market for sixty and seventy cents a basket. I think there is a great deal to be done wish proper selection in shipping. In regard to over-production this season, I have shipped several car-loads of apples to the old country and my prices have been fair, netting from $1 to $1.30 per barrel. I know parties that shipped at the same time to the same market and got $1.14 a barrel for the King; I realized $1 a barrel for the King. If the fruit is not put up well and in an attractive manner it will not sell well in any market. One trouble in shipping apples in barrels is that the fruit is over-pressed and heated up too high. There is no need for fruit in a barrel to be bruised any more than in a box.

Mr. WHYTE: Hardly five per cent. of the peaches landed in the Ottawa market were fit to eat; they were as hard as bullets. (Laughter). If the fruit had been put on the market in a fit state to use, I think a large quantity of peaches would have been eaten raw. I bought baskets of grapes this year that were perfectly unfit for human food. They were dirty and broken and bruised, and bunches only half filled, and never should have been sold at all. That is the condition of things that brings down the prices of fruit. When you are buying a basket of grapes you cannot tell whether they are good fruit or only fit to throw out. I think there would be a large market for western plums to be eaten raw if they could be put down in a good condition. The California plums you get soft and in a good condition to eat; but they are undoubtedly inferior to the Ontario plums.

Mr. FISHER: If you do not want this green fruit do not buy it. The reason we prefer to ship fruit green is that it then realizes more money than matured fruit.

Mr. WHYTE: This is not early fruit; all through the season we bought peaches that were unfit to eat.

Mr. BOULTER: Don't you get the names of the packers on the packages?

Mr. WHYTE: No, they don't do that.

Rev. PRINCIPAL GRANT: I think where we have been making a mistake the last half hour is forgetting that evidently Mr. Pattison is a humorist, and he intended that

paper of his as a joke, and we have been so dull that we have not found out his meaning. It has dawned on me for some time back that we might have seen it at the outset; for here is he a member of this Association, and yet his intimation is that the proper place for us is the penitentiary! (Laughter). Now it is quite clear that what he intended us to undestand was that there is a field for this Association, and that is to point out that you cannot produce too much of good fruit. (Hear, hear). This is the whole point. Mr. Shepherd indicated it very clearly in his experience with the Fameuse apple. He could get splendid prices for them if only the right steps are taken to bring the apple from the orchard to the tables of the consumers;—and it is a blessing that a word or two has been said on behalf of the poor consumer. I happen to be only a consumer, and I say I would have eaten a great deal more fruit this year even than I did, only that my experience was the same as Prof. Short's. The fact is it is almost the same with fruit as it is with eggs—if you once get a bad egg you don't eat another for a month. (Laughter). So you buy one basket of peaches or a barrel of apples, and you find the top ones good and all below very bad, and you get so disgusted that you fall back on your common chop and resolve to go without fruit. We could eat a great deal more fruit than we do if the fruit was only of the best quality and brought to the consumer, especially in the great markets, in such a way that he takes delight in it. Now what is needed is that steps should be taken along these lines. For instance, I have heard of one man in this Province who shipped 40,000 barrels of apples this year, and yet he did not make as much as Mr. Shepherd made out of one box—less in fact. (Laughter), And why? Chiefly because of the awful sinners in Montreal. (Laughter). There are not sufficient facilities there. For instance, on one occasion it was arranged that a great quantity should go by steamer, and they were sent in time, but there was some block or delay at the railway station, and as there was not another steamer, for some time, they were spoilt and had to be dumped into the harbor. Then again we have not got agencies in London that we should have, and that Mr. Shepherd referred to, or we have not taken the trouble to get into direct communication with stores such as the Army and Navy stores in London, and instead of that we allow the commission merchants to get the immense profits that we do. I think it is quite clear that the paper that was read was not meant at all to say that there are too many fruit trees or too much production. We have heard that cry all along the line. We are told that there are too many potatoes produced—(laughter)—that there is too much wheat produced, and we don't get a living price for wheat. And then manufacturers tell us that there is too much production of cotton and woollens, although all the time people only half-clad and half-fed. (Laughter). And yet we are hearing the cry of over-production! This is all nonsense —there is nothing like over-production in any one of these things. I, as a consumer, so think because I want to get them reasonably cheap so as to get enough of them; and you can only manage that, not by limiting the quantity of fruit produced, but by having the very best kinds, and that is what this Association is for, to show what is the best kind, what is the best way to get it into market in Canada and abroad; and I wish that there was ten times as much fruit produced in Canada as there is, for I believe that this is one of the very best countries in the world for apple production. I have eaten apples in almost every country in the world, and I do not know any country in the world where the apple is so good as it is in Canada. (Hear, hear and applause). And if arrangements are only made to get fruit in right shape to the best markets, and if we only raise the best kinds, there is almost no limit to the development that there can be all over Canada. You get peculiar kinds in different provinces. What Mr. Boulter says is true about British Columbia not producing certain kinds of apples; still they produce some kinds very well. The Northwest Provinces do not, but in Nova Scotia you can get Gravensteins the like of which I have eaten in no other country in the world. Then the Fameuse is the original habitant of Quebec because it was brought from France by the Sulpicians. But the great work of this Association is to go on doubling and quadrupling the production of good apples and seeing that these are got to the tables of the poor consumer. (Applause)

## ADDRESS OF WELCOME.

Mr. THOMAS BRIGGS, President Kingston Horticultural Society, read an address of welcome as follows :

*To the President and Members of the Fruit Growers' Association of Canada :*

GENTLEMEN,—On behalf of the District Society of the City of Kingston, I have the pleasure of congratulating and welcoming you on the occasion of this your annual meeting for the purpose of discussing and promoting the objects of the Association in all matters connected with the progress of horticulture and floriculture, in both of which great improvements have been made during the past few years, the result, no doubt, of the information obtained at your annual meetings by the discussion and explanation of the various experiments and different modes of cultivation.

The climate and soil of Canada are very suitable for growing most kinds of fruit, and every effort should be made to improve in quality and quantity, as fruit is becoming a leading article of export. Many thousands of barrels of apples have already this season been forwarded to England, where the Canadian apples rank foremost in market, and are readily disposed of at remunerative prices.

Referring to the floral department, the improvement in producing flowers in their varied classes is remarkable, as may be observed in some of the old leading kinds, such as the rose, gladiolus, chrysanthemums, dahlia, fuchsia, petunia, pansy and many other kinds too numerous to mention. This improvement is the result of skilful hybridizing and improved modes of culture, by which the plants are increased in size and form, and in colors and shades. It may well be said that the florist is perfect master in this department, and competent to produce flowers of almost any desired shade.

Yet, notwithstanding all the advances so obtained, it is expected, through the skill, science and perseverance of the members and cultivation, that further improvements will follow.

As electricity possesses light, heat and power and is now made available in nearly every branch of industry, it might possibly prove an assistant in advancing horticulture and floriculture, which you are endeavoring to bring to perfection.

I will not further intrude upon your time by referring to the subjects of your meeting, but will leave the numerous points for their proper place, to be discussed by those who have met here for that purpose. We hope that great benefits will result from your discussions and that your meetings will prove a success.

His Worship Mayor ELLIOTT then welcomed the convention. He alluded to the early history of the place, and referred to its many present advantages.

The PRESIDENT : On behalf of the Fruit Growers' Association of Ontario I assure you we appreciate very highly all the words of welcome that you have extended to us, also the kind invitations. It was with feelings of very great pleasure that our officers decided to accept your kind invitation to hold our annual meeting in the old historic city of Kingston, founded on a rock, emblematic of the firm and lasting loyalty of her people, and we feel that not only every fruit grower but every Canadian is under a debt of gratitude to your city for the many eminent men that she has produced—men who have had so much to do with the founding and up-building of this grand Dominion of ours. (Applause). We hope that your citizens will attend our sessions, feel free to take part in the discussions, and ask questions. We have men in our Society who are full of knowledge on these lines—(hear, hear)—who have grown gray in experimenting in different fruits and flowers, and who will gladly impart any information they can. We in turn expect to receive a great deal of valuable information from you, coming down here among the wise men of the east. (Laughter). Meeting in this building is suggestive that while we may give you some valuable ideas as to how to produce the berries, you in turn can teach us how to produce the cream. (Laughter and applause). The next item on the program is the President's address. It is an old time-honored custom, and I will have to confine myself to my manuscript. (See page 4.)

## NEW HYBRID CANNAS IN 1896.

By Mr. H. H. Groff, Simcoe.

All that was promised and hoped for by the originators of these most popular of all decorative plants has been fulfilled and more. Only those who have followed the rapid advance in quality and beauty of these grand results can fully appreciate the work of the past five short years; for in that time no other plant has been equally glorified by the hybridizers' skill. To-day we stand upon the threshold of a still greater and grander future, in the results of the first distinct outcross between the perfected hybrid of standard type and species bearing flowers of Iris form. The product of this cross in Italia, Austria and Burbank give us the forerunners of a type destined to claim a first place for size and beauty of form and coloring in the flower, with increased vigor and productiveness in the plant.

As a decorative bedder, aside from the beauty and brilliancy of its flowers, the Canna has no equal for tropical effect in this climate. Planted in clumps, or as centres in bordered decoration, the banana-like foliage in varying shades of green is most attractive; while in the dark foliage varieties, the reds, bronzes and deep plum colors, bear striking contrast to surrounding growth. Planted in solid beds, the system adopted at the World's Fair, the leaves feather beautifully to the border or lawn, leaving no stalk exposed to view.

The greatest advance, however, is in the flower; from the narrow petal and meagre spike of a few years ago, we have flowers to-day from six to seven inches in diameter, with petals from one and a half to two inches broad, in the old types.

To many original colors of unrivalled brilliancy we have added numberless shades and combinations of red and yellow, from the deepest garnet to the most delicate ecru. Of course many of the newer tinted varieties are not as free flowering as the older yellows and reds, but we must not forget that color and quality of bloom fairly entitle later hybrids to recognition.

If permitted to refer to my experience during the season just past, I would say, that after discarding some one hundred named varieties, my collection of these covered about sixty-five of special merit, with the addition of an equal number in distinct and beautiful seedlings of my own originating. In the former nothing that was worth buying was omitted, the cream of all choice American collections were fairly tested, and treated on their individual merits only. From these selections I secured, by hand fertilization, several thousand seed that cannot be duplicated commercially; many of these are already growing finely, and are ready for four-inch pots. Having effected similar crosses to Italia, Austria and Burbank, it is my expectation that these forms will be duplicated in many new colors, and in dark as well as green foliage varieties.

Let me say in conclusion, that my seedlings of 1896 were the source of great pleasure and satisfaction. From thousands of spikes only a small percentage were not worth perpetuation. Many produced, in addition to numberless variations in shades of standard excellence, new forms and types; some distinct forms peculiar to green foliage varieties were transferred to those with dark. Among the most unique forms were several cases of abnormal development of the inferior petal, it greatly exceeding in size those usually classed as superior, this novel variation from the original, adding much to the orchid like appearance of the flower.

In view of these experiences it is not unreasonable to hope, and even to expect, as has been beautifully and fitly expressed by Luther Burbank:—"That having taken a few steps into the measureless fields of scientific horticulture, these will stretch out as we advance into the golden sunshine of a more complete knowledge of the forces which are to unfold all graceful forms of garden beauty, and wealth of fruit and flowers."

## THE GLADIOLUS IN 1896.

By Mr. H. H. Groff, Simcoe.

When we consider that previous to 1896 the Gladiolus of commerce contained the blood of only two species, or at the most, three; the further infusion of that from a fourth, may not seem to be a very rapid advance in the line of perfection. But as is the case with most hybrids, time is necessary to assure the value and fixity of a cross, in view of the natural tendency to degeneration and reversion. As claimed by me at Woodstock last year, the past five years have seen greater progress in the development of the Gladiolus than the whole preceding period of its history.

The season just closed was, in my section of the country, unequalled in memory. From early spring to the first killing frost, continuous moderate rain and showers kept the landscape fresh in June verdure without intermission. At planting time I could say that no distinct variety of Gladiolus, obtainable by favor, friendship, or sterner business methods was unsecured. All that care, science, and a favorable season could do was in their favor, and the result showed that it was appreciated. In view of this experience I can only say that past expressions on the various sections remain confirmed.

Let me note in passing, however, that greater care is used in selection from the Gandavensis section; which when given, is the most useful as known to the amateur.

The Nanceianus section excels all hybrids of Saundersonii in the regal beauty and coloring of its enormous flowers.

Had less been promised for Childsi, we might not have expected the great claims for improvement to be fulfilled. Of all sections it lacks more points necessary to reasonable perfection than any other.

The later hybrids of the Lemoine, or Large Spotted section, make it to day the most beautiful of all, no other excelling it in rich and varied coloring, and even in size comparison is favorable.

The first steps after bringing a hybrid to a reasonable degree of perfection in form, is to increase its beauty of coloring. This is only fair to the amateur buyer, who cannot yet be charged with undue impatience; and I would like to say here that this must be more than on paper. In fact I have come to the conclusion that descriptions on paper fail to convey to the mind's eye a counterpart of the form and coloring appearing later under cultivation. So firmly have I become convinced of this, that my selections for testing are often made without reading the detail of description; varieties being increased only on merits proven in my trial grounds. It is here that the system of tested selections introduced by me, stands between the amateur and disappointment. Without detailing the several sections I claim that the advance in quality is limited to too few of the high priced varieties introduced; in fact the system of "collections" in high priced novelties invariably brings disappointment, in the small percentage of actual value secured.

Having prepared for the past season's crossing such a collection of perfected hybrids, and new species, two months continuous effort of over ten hours daily produced four pounds of seed. This from an expensive stock, the cost of an assistant, and my own time, must compete with that sold at $4 per pound. I simply mention this for the benefit of those who often ask for it in bulk. In my correspondence I am in touch with the growers of the world, and there is no place where it is possible to duplica te it, no matter how much one might be willing to pay In proof of its value all seedlings are withdrawn from my list excepting those of 1896, and these represent a material advance in quality over those previously offered. The largest flowers with me during the past season were from my own hybrids.

A year ago, in addition to the latest work of foreign specialists, I purchased the whole of Mr. Burbank's stock of California Hybrids the product of some fifteen years' selection and hybridizing. Suitable out-crosses with these and the choicest foreign novelties, gave me a quantity of seed the value of which is difficult to estimate.

Last month I was fortunate in securing the whole surplus (half a ton) of the collection of Dr. Van Fleet, of New Jersey, America's most noted scientific hybridizer of the Gladiolus; made up of the cream of one thousand named selections from the growers of the world, culled by him to the extent of fully two-thirds. In addition to the species

secured, many of which are little known and found only in botanical collections, I also got many new hybrids of Adlami, Aurantiacus, Cooperi, Cruentus, Milleri, Papilio albus, Platyphyllus, Leitchlinii, Trimaculatus and others; he retaining only some undeveloped seedlings for future amateur work, and in these I hope to participate later on. Dr. Van Fleet is resuming the practice of his profession. Referring to the first paragraph in this paper, which states that the number of species used in all the Gladioli of commerce is only four, the addition of crosses from the above new species must open a field of limitless variation.

Prof. SAUNDERS: I would like to ask Mr. Groff the names of two or three varieties which he referred to as having the lower petal very much enlarged, making it superior in size.

Mr. GROFF, Simcoe: Those are my own in name, seedlings of my own originating. Canadian hybrids you may call them.

Mr. HUGGARD: Do you find any difference between the light shades and the dark shades of the plants? Which is the most vigorous? I refer to the cannas.

Mr. GROFF: I find no difference in the vigor of the plant. The dark foliage varieties are equally vigorous with green, but they are not quite as free flowering. That is the only difference, but that is being overcome by crosses with the green varieties, the usual method for endeavoring to produce durable plants.

Mr. HUTT: I am sure many would like to hear from Mr. Groff a short account of his method of raising gladiolus.

Mr. GROFF: I suppose there is no place the size of mine in the country that has a greater diversity of soil. I have not more than two acres. On it I have sandy loam, a good heavy loam, solid clay and vegetable deposit. My habit is to grow them for one season on one block, another season on another, and so on, keeping them changed about, although when I cannot do this conveniently I usually fertilize them with hard-wood ashes, being the most convenient form of potash, and in the blooming season it is desirable to use a little bone meal. I usually plant them about four inches deep, which is the most convenient depth for the average soil, and water them during the season when it is dry. I think that having a supply of water means either success or failure. If you have not water at certain times they will not produce as good results as they would with an ample supply of water.

Mr. HUTT: How often do you flower your bulbs:

Mr. GROFF: You touch the question of degeneration, and in the Gandavensis section there are some varieties that won't bloom for more than two or three seasons, but there are some varieties that will bloom season after season. Even in the Gandavensis section there are varieties that will not produce bulblets at all, but only produce by division, and these go on and bloom year after year. I have some Gandavensis that produce no pollen, but sometimes bulblets; I received them from a specialist in Des Moines, Iowa. With him they would neither produce seed nor bulblets. The greatest difficulty in that way is in the Gandavensis section, but discarding those varieties that do fail you could get very fair results year after year, but occasionally you have to let them go without one season's blooming. As to hybrids, it is difficult to answer your question in a short time, newer hybrids, of course, possessing more variety from later crosses with species than the old inbred Gandavensis.

Prof. SAUNDERS: I have been much impressed this last season with the importance of a plentiful supply of water for Cannas, and might perhaps take the liberty of giving you the result of an experiment that has been tried at Ottawa with sub-irrigation to demonstrate this. We are not always favored with just such suitable soil as Mr. Groff has, that will hold a large amount of moisture, and in our flower-beds at Ottawa we have rather a dry, gravelly sub soil. In order to overcome this lack of moisture natural in the beds, one of our Canna beds was sub-irrigated by laying ordinary field drain tiles in one course all around the bed about 18 inches from the margin and laid perfectly level, so that water running into any one of these tiles would find its way evenly throughout the whole series. At one point there was an upright tile connecting with this lower series, and the hose was

turned into this upright tile once a week and allowed to run for several hours, the tiles being laid from 8 to 10 inches below the surface. The result was that the water found its way out at every joint, and by capillary attraction it came upwards, and after two or three hours you could see a little moisture on the surface of the bed, and the whole substratum was so thoroughly moistened that the Cannas had all the water they wanted. The result was that when this bed was compared with another bed on similar soil without this treatment the growth was considerably more than double, the plants very much more vigorous, and the flowers very much finer, and they came into flower considerably earlier as well, showing that that is just what Cannas require—a plentiful supply of water. I do not mean to say they would grow in a swamp, but they want under-drainage, but at the same time have the soil supplied with sufficient moisture so that the roots may be kept in a very active condition and the growth thus proceed very rapidly. In regard to fertilizers, we have not had very much success with bone meal. There are different qualities of that, and some of it may contain more animal matter than others; but we have had a great deal of success in using a pound of nitrate of soda to a fifty gallon barrel of water, and using this occasionally for watering the surface, or otherwise sprinkling the nitrate of soda in fine powder over the beds occasionally before rain. We have in this way succeeded in increasing the size of the flowers quite perceptibly, and promoting the vigor and growth of the plants.

Mr. GROFF: My reference to bone meal was for Gladioli intended for seed raising, not Cannas. The Canna only requires three things and it will be successful anywhere—plenty of food, moisture and heat; if it has plenty of rich food, ample moisture during warm weather particularly, and as much heat as possible, good exposure to the sun, it is bound to succeed.

Mr. BURRELL: Don't you employ nitrogen in any form to your Gladioli?

Mr. GROFF: No.

Mr. WHYTE: Is there any difficulty in keeping over Gladioli for a second season?

Mr. GROFF: I usually wrap mine up in paper, and if the quantity be small I sometimes cover that with wax paper. My bulblets, when the quantity is not so great that I can put them in boxes by themselves, I also wrap carefully in ordinary paper and cover that with heavy wax paper to prevent drying out. That is the only difficulty—to prevent the bulb from drying out during the winter. Then they should be kept in a cool, dry place.

Prof. SAUNDERS: What do you think of the Flamingo canna? That has given us a larger lower petal than most of the cannas. How does it compare with the other varieties?

Mr. GROFF: My experience with the Flamingo was similar to that of many growers in the United States. It did not do very well with me, although in some localities I believe that it has. I consider F R. Pearson a much better dark flower than Flamingo, and taking all points into consideration Alphonas Bohier is better than Flamingo, although not nearly so expensive. It has a much higher growth and slower growth than either of those I have spoken of, but the deeper colored one would be F. R. Pearson.

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## CHRYSANTHEMUMS.

Mr. H. L. HUTT, who was to have given a paper on this subject, explained that when Secretary Woolverton visited the Agricultural College this summer and saw about 120 varieties of chrysanthemums growing in the conservatories at the College, he asked the speaker for a paper for this meeting, but the latter had not been able, on account of pressure of work, to give any time to that subject, but he hoped another year to be able to give something worthy of the subject. He had been taking photographs of some of the best varieties, and these were passed around the meeting.

## THE SWEET PEA.

By R. B. Whyte, Ottawa.

Any observant gardener who has studied the catalogues for the last five or six years will have noticed the great increase in the varieties of sweet peas offered for sale. Dealers who listed ten or twelve kinds in 1890 now catalogue seventy or eighty varieties, and every year is adding to the number. No less than twenty new kinds were offered for sale this year for the first time. There is now considerably over one hundred named varieties on the market, and Mr Eckford—who has originated the majority of the best new kinds—has promised several more next season, which are said to be finer than any heretofore offered.

Up to two years ago all varieties were of one type in form and habit of growth, a tall, growing vine, climbing by means of tendrils over anything that came in its way in its efforts to get as near the sun as possible, bearing flowers with a broad, rounded petal at the back called the Standard, two smaller petals called wings, which bend over as if to protect the central portion, formed by two petals joined together, called the Keel, inside of which are the essential organs of the flower, the stamins and pistil. The first departure from this type was in the so-called double sweet peas, in which the single standard is multiplied two or three times. These have not proved satisfactory, a very small percentage of the seeds produced double flowers, and there is no increase in the attractiveness of the blossom. A great beauty in the sweet pea is the straight, smooth standard which sets off so well the barred colors of the wings and keel. Any improvement must come, not from multiplying the parts—it is now perfect in shape—but from new combinations of color, more flowers on stalk, and more substance in the petals.

Another departure from the type of growth is the much advertized dwarf "Cupid," which has signally failed to justify the claims made for it. It is undeniably a dwarf, forming a mat of 12 to 18 inches diameter on the surface of the ground, and is interesting on that account, but in every other respect it is a disappointment. Four-fifths of the seeds sown in this locality were unfertile. The flowers are small and the stalks short, and in every way it is inferior to Emily Henderson or Blanche Burpee.

The causes of the great popularity of the sweet pea are not hard to seek No other flower combines so many points of excellence. In beauty of form, beauty and variety of coloring, exquisite perfume, convenience for cutting, and durability after cutting—for they can easily be kept fresh for a week—it is unequaled, and if properly cared for the quantity that can be taken from even a small row is enormous.

A correspondent of "Garden and Forest" kept a record of the stalks pulled from a row 60 feet long, from June 11th to October 20th, when the last one was picked The total was nearly fifty thousand beside a large number that were allowed to go to seed. From no other flower could we get the same profusion of color and fragrance.

The best soil for growing sweet peas is a good, heavy clay loam, rich and capable of retaining moisture, as it is only by keeping the roots cool and moist that we can succeed in having them in bloom the whole season If the soil is not very rich put on a good allowance of well decomposed stable manure the previous fall, dig it deeply in and mix thoroughly with the soil, as they do not take kindly to manure in contact with the roots If not applied till the spring bury it deeply, several inches below the seed bed. If you want to feed them extra well a dressing in the spring of a fertilizer rich in potash—or wood ashes—makes stronger and more vigorous plants.

Plant as early in the spring as the ground can be worked. They are quite hardy and will stand several degrees of frost without injury; indeed, in dry ground where water does not lie, they may be planted in the fall with perfect safety. Make a trench three inches deep, drop the seeds two inches apart, cover one inch deep at first and do not fill in the other two inches till the plants are well up above the ground. If all the seeds grow pull out every second one—or transplant to another place, if wanted, after all danger from cutworms is over—as four inches apart is close enough for the best results.

If your soil is light and sandy, it will be necessary to plant much deeper. Make the trench six inches deep and fill in a little at a time as the plants grow, taking care not to cover them with the earth.

The soil must never be allowed to become dry; the frequent use of a sharp rake keeps the surface open and prevents excessive evaporation, but in addition water must be supplied liberally after the middle of June, unless in unusually wet seasons. Do not waste the soap-suds on wash day; it makes one of the very best fertilizers.

Some of the new varieties grow so tall—in good soil as high as six to eight feet—that it is necessary to provide support for them not less than six feet high. The most convenient trellis material is poultry netting with a two inch mesh, fastened to stout posts, firmly set in the ground, with a top rail to keep the posts rigid so that the netting can be stretched smooth.

A very handy trellis can be made from seven or eight feet of netting, bent in the form of a cylinder and the ends twisted together, with a stout wire hoop at each end to keep it in shape. This, set on end, fastened to a stake to keep it upright, and the peas planted around the outside, makes a very pretty object in the garden, when covered with flowers of one or two varieties. A great advantage of this style of trellis is that it can be set up anywhere on a few square feet of ground, and can be shifted from place to place as wanted each season. If one is willing to take the trouble to tie the vines to wires an ordinary grape vine trellis does very well with the wires about eight inches apart.

The insect enemies of the sweet pea are few in number. Cutworms are sometimes troublesome. When numerous they may easily be poisoned by placing little bundles of any succulent weed dipped in Paris green and water and laid every two or three feet along the rows, or they may be dug out in the usual way.

A more serious evil to contend against is the blight, this is only troublesome in very light soils, or where peas have been grown several years in succession in the same place. It first appears when the plants are about a foot high, the leaves first turn yellow, then brown, and in bad cases the whole plant becomes black and dies. There is not much known about the cause or nature of the disease, or how to cure it when it appears. Probably spraying with Bordeaux mixture is as good a remedy as is available.

A great deal of what is taken for blight is really caused by that pest of the greenhouse and window garden—Red Spider. It is so insignificant in size that it is seldom observed unless looked for, even then it takes good eyesight to locate him, though the results of his presence are evident enough. Fortunately it is very easily kept in check, a vigorous spraying now and then from the waterworks hose if available, or from a spray pump is all that is necessary.

In describing varieties, shapes and colours run into one another so much that it is somewhat difficult to classify them, The colours white, red, yellow and blue are so inextricably mixed and blended that any classification founded on colour is unsatisfactory. In shape there are three fairly well marked divisions; the first, from which all the newer varieties are derived has the standard somewhat wedgeshaped and bent back from the rest of the flower or reflexed as in "Painted Lady," the second, of which "Blanch Burpee" is a good representative has the standard straight and erect with the wings and keel close up to it; in the third form, as in "Lottie Eckford," the standard is inclined forward at the edge as if to envelope the wings, this is known as the hooded form. Many of the most admired new sorts belong to this class. In some cases this tendency of the standard to curve forward is carried so far as to cause a roll at each side as in Oddity, when this bending forward is carried to such an extent it may be interesting to the specialist from its oddity, but it certainly could not be called beautiful.

Whether you plant named varieties or mixed be sure to plant enough: you will be surprised at the number that can be used as cut flowers, not only in your own household but by your friends. I have yet to see the visitor to my garden that was not delighted to get a boquet of sweet peas. Give them away freely. If you want to have an abundance of flowers all summer they must be picked frequently, never allow them to go to

seed. If you plant them mixed get the best Eckford mixtures, but it is much more satisfactory to buy named varieties, as you can then select such colors as you prefer. Most of the mixtures have too large a proportion of dark colours, for the best effect, in my opinion, not less than four-fifth of a collection should be of light or medium shades.

In making a selection from the many varieties offered for sale a great deal will depend on the individual taste of the grower, what colours one prefers and also on the amount of space that is available ; to grow anything of a larger collection requires a long stretch of trellis. A weak growing kind is apt to be overgrown by a stronger neighbour unless there is about five feet allowed to each kind.

Probably a collection of twelve sorts would satisfy the average grower for variety. In that number a very fair representation of the different shapes and colours can be had. Leaving out of consideration the six new kinds sent out this year by Mr. Eckford, as very few growers would care to pay the price asked for them, 2s. 6d. the package, I would recommend, as the best out of seventy varieties grown by me this season, the following twelve :

1st, " Blanche Burpee," decidedly the best white to date, of the largest size, fine form, good substance and a profuse bloomer.

2nd, " Primrose," pale primrose yellow, a very delicate and handsome flower, by some " Mr. Eckford" is considered a better yellow, but it has not done so well with me.

3rd, "Ramona," a new Californian variety sent out this year, of largest size, slightly hooded form, colour white, with faint rose pink lines on the standard, a lovely flower, strong, vigorous grower and profuse bloomer,

4th, "America," also a new one from California, the best red and white stripe, white ground with brilliant blood-red stripes. A most effective flower, either in a boquet or on the trellis.

5th, "Princess Beatrice," pale blush and pink. An old favorite, much grown by florists for cut flowers.

6th, "Lottie Eckford," white suffused with lavender, standard and wings with a delicate blue edge, a most exquisite flower.

7th, "Countess of Radnor," standard a clear lavender, wings a little darker, good size, hooded form, the best of the lavenders.

8th, "Katerine Tracy," new last season, by far the best pink to date, of largest size, good shape. Clear rich pink all over, the most profuse bloomer in my collection, should be in every garden.

9th, "Lady Beaconsfield," salmon, pink and primrose, not of largest size but fine form and a charming combination of colour.

10th, "Lady Penzance," a cherry pink with pale carmine veining, a unique colour, good form and profuse bloomer.

11th, "Fire Fly." The best red to date, not large in size or of the best shape, but very brilliant in colour.

12th, "Boreatton." The best dark sort, an old favorite, deep velvety, maroon and claret.

Such a collection would require at least sixty feet of trellis, and if well grown should produce not less than fifty thousand trusses in the season. Do not think that that is far too many, if you have lots of friends—and what gardener has not when he has flowers to give away ? You can easily dispose of a great many more than that. Of course twelve kinds does not include all that are worth growing ; if you liked you could very well add another dozen to the number, every one of them desirable flowers to have To my taste the second best dozen would be made up as follows :—"Lemon Queen," a fine white with a touch of yellow on it the first day after it opens ; "Blanche Ferry," pink and white ; "Daybreak," a new American variety, white and scarlet ; "Mrs. Gladstone," blush and pink ; "Splendor," deep pink ; "Venus," salmon pink ; "Princess of Wales" blue

and white striped; "Gray Friar," should be bluish gray but is often spoiled by dark stripes or blotches, inherited from "Senator," from which it has been selected; when perfect it is a very fine flower; "Stanley," purplish maroon; "Dorothy Tennant," mauve; "Duke of Clarence," dark mauve and purplish blue; "Captain of the Blues," the best blue.

No doubt some of you will think that it is all nonsense growing so many kinds, but I can assure you there is a great deal of pleasure to be derived from taking any of our garden flowers, sweet peas, asters, poppies or any other flower you prefer, growing all the available varieties of it, making a thorough study of their habits and peculiarities and discarding the inferior sorts, retaining the kinds that please you most for future use. Then the next year take up some other flower, pursue the same course with it, and in a few years you will have acquired a knowledge of the floral kingdom, and developed an interest in your garden, such as you never dreamt of in the old days when you were content to plant the same few papers of mixed seeds year after year.

Dr. WALKEM: When we were up in Manitoba this year all the visitors were struck with the extraordinary character of the sweet peas, not only beautiful in color but very large size, far exceeding in size any grown in this part of the country, where they were not as good as usual. I would like to know whether there is anything in the soil or climate of Manitoba that would give these surprising results. We noticed also that all the ordinary garden flowers there were very much brighter than those grown with us.

Mr. WHYTE: I do not think soil has any particular effect, especially if you feed them and water them well—particularly water. Sweet peas should be soaked every second day. This year I had only to water my peas once, but we had rain every three or four days all summer. In Manitoba the heat is not very great, and the soil is very rich This year a friend of mine had the finest specimen of "Lottie Eckford" I ever saw; far better than I grew, but the reason was that he had them in some shady place and the soil was very rich and he watered them well. The flowers were 30 per cent. larger than any other.

Prof. SAUNDERS: I think there is one other element connected with the sweet peas in Manitoba and the Territories, and that is the immense amount of sunshine they have there. Why, their hours of sunshine exceed ours by from twenty-five to fifty per cent. taking the season through, and there is no doubt that that has a very important bearing indeed on the size of the flowers of the sweet pea. The same thing, however, you will notice in parts of British Columbia where they are deficient in sunshine. There it seems that the extra moisture, added to the richness of the soil, makes up to some extent for the lack of sunshine, although I do not think the sweet pea in British Columbia, taken as a rule, will be often as large as those grown in Manitoba and the Territories. That peculiarity is not confined by any means to the sweet pea. I have noticed it in connection with a number of annual plants, particularly stocks, verbenas and also asters; I think they are finer than they are with us, showing that this great amount of sunshine is a very important factor in bringing out the greatest perfection in beauty and size and color of flowers.

A DELEGATE: Did you ever find a difference in the direction of planting the rows east and west or north and south?

Mr WHYTE: It is generally believed that north and south is the better way so that you get more sun both in the morning and the afternoon. I have not followed that because it is not convenient; I do not see any difference.

Prof. SAUNDERS: What experience have you had of planting seed in the autumn?

Mr. WHYTE: I have not had any experience, but I have a friend who regularly plants just before freezing, and he says he has his peas a week or two weeks earlier than when they are planted in the spring.

Prof. SAUNDERS: From the strong statements being made that it was an easy thing to do, I thought I would try it myself last year, and I took every precaution, following the directions that were published and there was not a solitary pea came up in the spring. I planted them very late.

The SECRETARY: Did you have the usual amount of snow?

Prof. SAUNDERS: No, we did not. It was a hard year, I must admit.

Mr. BURRELL, St. Catharines: We have usually planted them in the fall in the neighborhood of St. Catharines I have the chicken wire drills 50 or 60 feet long and between 5 and 6 feet high, and we put them in about 5 or 6 inches deep in the fall, and we had them three weeks earlier. By planting diligently we have had flowers almost all the summer.

Prof. SAUNDERS: I suppose a good deal depends on location?

Mr. WHYTE: And something depends on soil too. If it was a very light soil frost gets in more, and they would not be so hardy. Even last year, hard as it was, there was quite a number of seeds came up that were sown the year before.

## THE AMATEUR'S ROSE GARDEN.

By MR. O. G. JOHNSTON, KINGSTON.

We find mention of the rose in the earliest writings, both sacred and profane. It was undoubtedly very generally esteemed and used both for ornamentation on both public and private occasions. As an instance it may be mentioned that the Romans put it to a very significant use at some of their private dinners and feasts. A rose was placed over the principal door, and he who passed under it silently bound himself not to reveal anything that was said or done within. Hence arose the saying "Sub Rosa."

The limits of this paper will not allow me to give a history of the rose, but I will speak rather of the way to cultivate it. There have been so many papers read on the rose and so many good books printed that it is hard to say anything new, but as most of the books written and papers read have been English and suitable to an English climate, therefore they would not do for this climate and are a little confusing to the amateur. This paper is for this locality; further south you should start earlier and further north a little later.

The first requisite in the culture of the rose is the preparation of a suitable place for planting them; the best position is none too good for them. What I consider the best is facing the east, with protection on the north and west. I do not mean protected by big trees but with fences or hedges. The rose likes to have a fairly open exposure with a free circulation of air about it; but when I say that I do not mean such a circulation as would drive a forty horse power windmill. In connection with the choice of location, we must see that the roses are provided with a proper soil; they will do well in any good garden soil free from standing water. The soil of course must at first be thoroughly manured as the rose is a gross feeder. Roses that have been grown out of pots should if possible be planted while in a dormant condition in the spring as it is almost impossible to lift a rose while the sap is running and at the same time have it make a good rose. Roses that are pot-grown can be planted any time in this latitude from the 10th of May to the 10th of October, but if set out in midsummer, a little extra care will be needed in watering them.

Respecting the size of plants that should be set out, I advise those who can obtain them to put out plants of two years' growth. Do not put out bantlings—bantlings are plants sent out by mail, 20 for a dollar. Of course you get a beautiful catalogue with them and a coloured plate of roses. Look well at the picture, as it is about all the roses you will see from plants sent out by mail.

If you have a greenhouse to nurse them in for a season you may succeed with them, but one honest two year old pot-grown rose is worth fifty of the baby roses that are sent out by mail.

In planting the bed, if of more than one variety, the strongest plants should go in the centre of the bed and the weaker ones on the outside. The pruning of roses is one of

the most important features connected with their culture. All roses that come from the open ground should be pruned immediately after planting, as the shock of transplanting must be met by a shortening of both shoots and roots.

The shoots being shortened the number of buds to draw upon the sap is reduced and a more vigorous growth is followed. Pot-grown roses will not need pruning the first year they are planted, as there is no disturbance of the roots in planting them. Plants of delicate habit should have severe pruning; do not prune till the spring as then you can better see the damage that has been done by frost. Besides pruning the plants in early spring, a summer pruning in the middle of July is helpful, in order to induce the formation of flower buds later in the season.

Just here it would be as well to say a few words about planting the rose. I will not take up your time by telling you all the ways it is done by amateurs, but I will tell you the right way.

The heaped up mound of soil that would make a pretty bed of geraniums is not the style of bed to plant roses in. You can elevate your bed above the level if you like, but it should be as nearly flat as possible on top and moderately firm, make an excavation with a trowel or any thing suitable, one inch deeper than the ball of the plant you are going to put in also two inch wider, place the plant in the centre of excavation, press the soil around the ball of roots and fill up level to the surface. Be sure you plant them firmly as more plants are lost by loose planting than by insects.

The distance to plant is about two feet apart. If planting them in a long border I would plant them eighteen inches in the rows and three feet between the rows; that with a good watering will complete the operation of planting. If you syringe well every fine bright day you will find in ordinary weather it will keep the soil moist enough.

About the 1st of June after the roses have broke freely is the time to put on a mulch of rotted manure. They will also be benefited by digging the same in after the summer crop of roses is over, and applying another mulch on top, cutting all weak growth out and shortening the flowering shoots back; if you follow this up you will be gladdened by very fine roses in September and October.

Manure, if new, should never be applied to come in contact with the roots, but may be spread on the surface of the earth as a mulch. All animal manures are useful for roses. Horse manure is much better for heavy soil than for light. Well rotted cow manure is best for light sandy or light black soils, do not use cow manure for any soils that are inclined to be wet and sticky. Before you can grow roses in a wet or sticky soil it must be under-drained. There are also other good fertilizers for the rose, such as soot, spent hops, flour of bone and bone meal. Also a dressing of lime when you dig in the winter mulch in the spring, and another dressing before you put the winter mulch on in the fall. Wood ashes are also an excellent fertilizer for the rose.

During the formation of the flower buds, which will be about the 1st of June, an application of liquid cow manure will help to swell the buds and give texture to the flower. Do not use any after the flowers buds begin to show colour.

*Insects.*—Just about this time keep a close watch for insects. I will now tell you the principal insects you may expect to find, for although these are not all the enemies of the rose, yet if you keep these down the others will not do much damage. The "aphis" or green fly is a small green louse about ⅛ of an inch in length, when fully grown, but you should never see it that long, as it will show neglect on your part. The aphis is very prolific in breeding, so look well after it. Much the best destructive agent is tobacco, of which there are several preparations put up for use, or you can boil some tobacco stems and apply with a syringe. The right strength for use is about the color of ordinary tea. Another remedy for the aphis is quassia chips boiled in soft water. The above remedies can be applied with a syringe, or with a whisk broom for a few roses.

*Mildew.*—The best remedy for mildew is flower of sulphur. This should be applied the moment the disease makes its appearance. It comes in the form of a white downy

appearance on the young tender leaves. The moment that it is seen even if only one spot, sprinkle a little sulphur on the leaf. If there are a number of spots apply the sulphur with the bellows. This is an important matter, as it is a fungus growth that spreads with great rapidity. One moment to-day in applying sulphur is worth an hour to-morrow, as mildew is contagious, spreading from one plant to another very rapidly.

The rose hopper or thrip is perhaps the most troublesome pest with which the rose is afflicted in the open air. It is a small, yellowish white insect, about the one-eighth of an inch long with transparent wings. They usually prey upon the leaves from the under side and they are very destructive to the plant, making it assume a sickly yellow appearance. By syringing the under side of the leaves, and dusting on white hellebore, it will soon destroy or disperse them to some other rose bushes that are not being looked after.

*Red Spider.*—This is a most destructive little insect if neglected, but not much trouble in the garden, as they do not like water any better than tramps do, so by keeping your roses syringed from the under side you are not apt to be troubled with them.

I have now named the principal insects and diseases of the rose, and told you how to keep them away. If you keep your roses free from the above insects you will sure to have fine roses.

I will now say a few words in regard to varieties to plant. The twelve varieties of roses that I would recommend to plant in this latitude are not what you are apt to see recommended as the best dozen in a catalogue. It is only human nature to recommend what you have got in stock, but the twelve I recommend I consider the cream of several best dozens. These are :—

Anne de Diesbach, Baroness Rothschild, General Jacqueminot, Mabel Morrison, Jules Margotin, Magna Charta, Louis Van Houtte, Paul Neyron, Melville de Lyon, Prince Camille de Rohan, Alfred Colomb, Marie Baumann.

The roses I have mentioned are all perfectly hardy in this latitude, and are also good autumn bloomers. They also embrace a good variety of colors. Any one who has not seen these twelve beautiful roses in bloom in the early morning, while still wet with dew has missed one of the greatest pleasures of life.

I will now say a few words about climbing roses. The three I consider the best for this climate are :—(1) Baltimore Belle, blush white ; (2) Prairie Queen, bright rosy red; (3) Seven Sisters, light blush. These varieties will bloom profusely in mid summer the following season after planting. The care they require is identical with bush roses, excepting pruning. All the pruning they require is to cut the thinnest wood out in the spring and also what is winter killed.

You can either lay them down in the fall and cover with light material or cover them up as they stand. I prefer to lay them down. Just here I would say do not be in too great a hurry to take off winter mulch. About the 1st of May will be about right for this latitude, for I find that if taken off before the sharp frosts that we sometimes get in the latter end of April it does them an injury. When you take off the roughest of the mulch and prune and fork the bed over, there is nothing further to be done except to watch out for insects and mildew, and syringe on all fine sunny days.

Just here I would say, the amateur who is likely to get the most roses and the most enjoyment from his garden is the one who will work from five minutes to fifteen minutes every day ; and the one who will get the least roses is the one that will go out in the garden in the spring, throw his coat off, work all day, get tired out, and never go near the roses again till they are all mildew and eaten up with insects. This picture is not overdrawn, as I have seen it done this way myself.

To have beautiful roses you must always have them with you in mind and heart. And now, if this paper has made anyone here feel a longing to grow roses, I would earnestly recommend them to purchase a book about roses, written by Cannon Hole. This book of 322 pages is a charming compilation by a gifted writer, who, though an amateur,

has done more to further the growing of beautiful roses than any other man. No one has written on floricultural subjects so lovingly as Canon Hole, and his book on roses no amateur or gardener can afford to be without.

Prof. SAUNDERS: I think the remedy Mr. Johnston suggests for the thrip, which is the most troublesome of all insects—the application of hellebore—would hardly be sufficient. The other remedy referred to, tobacco, is an excellent one; but the reason why hellebore is not an efficient remedy for thrip is that that insect is furnished with a beak with which it punctures the under side of the leaf and sucks the sap out. It could not possibly get enough hellebore to do it any harm, because the puncture is so small. If it could be made to eat the hellebore no doubt it would poison it, but as that class of insect does not subsist in that way it is impossible to reach it with Paris green or hellebore or any of these things that require to be eaten in order to poison the insect. It does not do to apply the tobacco syringe on the thrip when the insect is an eighth of an inch long and wings fully developed, as Mr. Johnston has well described it in the adult state; but in the young state that insect is a soft bodied wingless insect practically in a larvae form. We put four ounces of tobacco to a gallon of water and boil for three or four minutes, and it is better to add soft soap. The nicotine in the tobacco and the alkali in the sap penetrate the body of the thrip and poison it. There is one other insect which we find exceedingly troublesome in Ottawa, that is the leaf roller. It gets into the bud of the rose quite early in the season and very often eats out the substance of the bud before the flower has time to expand. That is very easily got rid of by soaking the plants, when the leaves begin to expand, in a preparation of a teaspoonful of Paris green to a pailful of water, and we invariably adopt that plan in Ottawa, where we have some 200 varieties of hybrid perpetuals, and we have all the varieties I think Mr. Johnston has referred to. I think Mr. Johnston has given us a great deal of information, and I feel very much indebted for his practical paper.

Mr. JOHNSTON: I do not like to recommend Paris green because my garden is not an experimental farm; it is not a rose garden to make money out of; it is an amateur garden with a man that has four or five children. I don't know what kind of children some people have, but mine will go around and smell the flowers and put them in their mouth and taste them. I should be very sorry to have roses spread with Paris green, in the smallest quantity, as it is a deadly poison. We use Paris Green, but it is in the green-houses outside of the garden. In a great many cases it is absolutely necessary to use the Bordeaux mixture, but for private gardening it is not wise. As regards the wingless insect I claim that white hellebore put on its body while in a larvae state will kill it; and if you catch a few of them in a larvae state at any time and roll them in hellebore they won't roll in anything else. (Laughter.)

Prof. SAUNDERS: There would not be much profit in growing roses if we had to catch each one of those larvae and roll them in hellebore. (Laughter). That reminds me of an argument a man used with me at one time to show the utter inefficiency of Paris green. He brought me a potato bug that he had put in a bottle of Paris green and rolled in it till it was completely covered, and the insect was throwing its legs about and enjoying itself in this Paris green as well as if it would in flour or anything else.

Mr. JOHNSTON: That was a hard-shell bug, not a soft-shell bug.

Prof. SAUNDERS: I asked this gentleman what he would do if he was thrown into a barrel of Paris green—would he open his mouth and eat any of it? He thought not; he would keep it shut. Of course that was a hard-shell insect. I have tried the hellebore with the thrip in all stages of their growth, and I never found it of any material benefit. I think Mr. Johnston is too nervous on that Paris green question. Where a teaspoonful of Paris green is put in three gallons of water and stirred, and made a fine spray of, the quantity you will find on any one rose is so infinitesimal that if a child could get it all in its mouth it would only act as a very gentle tonic and never do any harm. In the old days arsenical preparations were very commonly used as tonics. I have never yet known of an instance where Paris green, which is so universally used over the civilized world, if carefully sprayed on plants or trees or shrubs, diluted to about a pound to 200

gallons of water, has ever done any harm. Farmers who were prejudiced against Paris green and afraid it would kill their cattle are now converted to the opposite side; and I think that Paris green for the roses can be used without danger at all if used in that way; but if anyone fears to use it hellebore will answer the same purpose.

Mr. JOHNSTON: I quite agree with what you say about the Paris green, but I am alluding to where you have a few roses, and where the lady of the house does not send for a quarter of an ounce of Paris green but for a quarter of a pound, it is so cheap, and you cannot get her to put on that small quantity; she thinks if a little is good a lot is better. It is all well enough around an experimental farm where everything is done just so.

Mr. BURRELL, of St. Catharines: I should like to ask Professor Saunders if it is true as stated by several entomologists that I know, that hellebore does kill by contact.

Prof. SAUNDERS: I think it has some effect upon the gooseberry saw-fly worm by contact; that is a very soft bodied larvae. I have known them die in ten minutes by the watch after being sprayed with an application of that sort, and I think there would be hardly time enough for the hellebore to kill them by being taken into the body.

Mr. BURRELL: I have used it on the pear slug purposely for that. It has a soft and almost sticky body, and I always fancied it killed by contact, more so than Paris green. I should like to ask Mr. Johnston what is the best soil for roses.

Mr. JOHNSTON: Good firm soil is the best.

Mr. BURRELL: Light sandy soil is not good?

Mr. JOHNSTON: It is not good; it is almost impossible to make it good for roses.

Mr. BURRELL: Do you know anything about this Climbing Rambler; is it any good?

Mr. JOHNSTON: I would be very sorry to say. I have about a hundred to sell. Wait till I sell my hundred and I will tell you about it.

Mr. WHYTE: Does not the hellebore affect these insects by closing up the breathing pores and preventing them from breathing, the same as any other fine powder would?

Prof. SAUNDERS: I do not think that it very often occurs that an insect is killed by inhaling any dust like that through the breathing pores. The breathing pores of insects are covered with a very fine exquisite network to exclude all particles of dust. It is so very fine netted that while it will admit the air it will almost effectually keep out all particles of dust. The pyrethrum powder will kill insects, but that is known to be because of a poisonous element in the powder. In regard to the pear slug the hellebore is no doubt very effective on that, but I have always found the Paris green equally effective, and although the pear slug is a very soft-bodied insect I do not think it is so easily killed as the larvæ of the saw fly. Although soft, it is covered with a slimy, sticky exterior, and I was very strongly impressed with the vitality of the creature some two or three years ago. I tried some experiments to kill them with dust. I selected a leaf on which there were a number of these slugs and peppered them all over with dry sand and isolated this leaf so that I could watch them, and I found that they had all crawled out of this coat and got a new coat underneath. I tested them in a few days again and they came through the same way with a new coat on, and I gave up the experiment feeling that there was no practical value in the use of dust for killing that insect. It shows they are not killed so easily as some other insects are with slight applications.

Mr. WHYTE, of Ottawa: One of the most important considerations in keeping the roses free from insects is to be in plenty of time with your applications. A great many people wait till they see the insects on them; then they are too late. Begin early in the season before the leaves are formed. To save spraying with this thing and that thing I compounded all my elements and did the whole thing with one spraying; that is, I boiled the tobacco and added whale oil soap to it and the hellebore, and made one application, and it was most efficient.

Dr. WALKEM: What is the best mode of protecting roses in the winter time? I found manure ineffective and ultimately I took to covering them with earth. My experience is that that is the best mode of protecting them. I had a great deal of difficulty with hollyhocks; they completely died out and it was very difficult indeed to protect them.

PRESIDENT: I will ask Mr. Race to answer that question and also say a few words on rose culture. Mr. Race is a grower of a very large collection of varieties.

Mr. RACE: What I know about the rose is purely as an amateur. I have no roses to sell and never do sell them, although I have been frequently sold by them (laughter). I have had considerable experience in both propagating and growing the rose. In fact I have been frequently referred to as the crank of Western Ontario on the rose. I am not a crank, for a crank is a thing that requires somebody to turn it, while I have yet to meet the man or woman that has been able to turn me from my conviction that the rose is the queen among flowers (applause); that with a very little common sense and a very little labor any man or woman that has a small piece of ground can grow a beautiful rose and should do so, not only because the rose is the most beautiful flower, but I believe that its influence on the grower, on his family and his friends is such as to justify any man or woman giving a great deal of attention to it. I give a great deal of credit to the rose for the very excellent character that I have myself (laughter), and it has done a great deal in moulding my family; and I know my neighbors must love the rose because they come to my garden a very great deal in the summer time, and I do not suppose it is because they love me or come to see me (laughter). While I agree with a great deal that Mr. Johnston has said in his paper, I think he is making the matter a little bit too difficult. My whole effort in speaking on the rose is to make it just so simple as to encourage everybody to go into the cultivation of that flower. It is the easiest matter in the world to grow the rose. I have seen the rose growing in many of the States and in England, but I can show you in my own garden just as beautiful roses as they can produce anywhere. The first thing in order to produce a beautiful rose is to have that beautiful rose in your heart and mind, that is, to have the love for the rose. Love will overcome all obstacles no matter in what direction. The first thing to do is to have your ground very rich. I have my ground so immensely rich that I can produce almost any amount of wood in most varieties of roses that can be grown, and thus I overcome the difficulties of a great many of those insects because I almost defy the ravages of the green fly. I let them feast away upon my roses and yet they cannot check the growth, it is so rank; but the next best thing to deal with that green fly is the finger and thumb. I am not at all delicate in going among my roses, for I get up early in the morning, as most newspaper men do, and I take them between my finger and thumb and clean them off; that is about all I do for the green fly. The most destructive insect to my roses is the leaf roller. For that I use Paris green water. Sprinkle it on early in the season just as the leaves are coming out and just as the buds are forming. You will find that that leaf roller will roll up in the leaf and it will come out in the night time and take a bud, generally the choicest, eat a hole right in the centre and destroy the flower. Paris green is the best thing for that, and the man who is so careless about his premises as to be afraid to have Paris green on them is not going to make a great success in cultivating roses. There is a discrepancy there somewhere. I use sometimes hellebore, but I prefer Paris green because it requires such a very small quantity of it. Then with the very rich ground and plenty of sun and a little bit of attention of that kind, you can produce all the roses that you like. I produce my roses to give away, and I have more pleasure in giving them away than I do in looking at them; and I will tell you here that there is nothing in the world that will bring any person so many friends as as to have a nice rose garden. I know that my friends multiply exceedingly during the rose season (laughter). I have now about 200 varieties, but I can pick out 25 or 30 varieties from any catalogue and produce more beautiful bloom than any man can from 500 varieties, because they will be assorted so that they will give much more bloom. I would recommend you to get a few standard varieties and stick to them until you want to go into larger extension. The collection that was given is a very good dozen

indeed, but I think it might be improved upon. I think the white rose, Madam Plantier, was dropped off. I would not drop it off. The only objection to it is that it has a short season, but it produces a beautiful effect while it is in bloom. It is a magnificent bearer for about two weeks, and it is really worth all the trouble that there is in producing it just for the sake of these two weeks. I protect my roses almost entirely with maple leaves. I allow them to grow as high as they will grow, then bend them over and lay a stick of wood or something to keep them, and spread them over with maple leaves. Where I have them in squares I trench them right up as high as I can in the fall with soil on each side and then also cover them with leaves, but my largest patch is along a lattice fence, and I bend them down through the fence as well as I can and lay a piece of wood on them and cover them over with leaves. This is all the protection I ever give them. I bring my roses through the winter without any difficulty in any way. I do not remove that covering until pretty well on in the season, and when I uncover them I trim them back pretty short and after the blooming season I then manure my roses. With a trowel I remove the soil from the roots and put in just a little of very rich manure around about the roots and cover it over with that same soil. I can make the Magna Charat variety bloom nearly all the season by treating it in that way. In the fall I mulch my rose-buds with manure, and after that lay them down and put on the leaves. (Applause.)

The President then introduced Mr. Herrington, of Napanee Horticultural Society, which is one of the seventeen or eighteen branch societies affiliated with this Association.

## NAPANEE HORTICULTURAL SOCIETY.

By Mr. W. S Herrington.

Fruit growing is neither a vocation nor an avocation of mine, and it would be the basest presumption upon my part to attempt to instruct the members present in any branch of that important industry. I might entertain you, however, were I to relate to you some of my interesting experiences in raising berry bushes. Berries, I have none. Such entertainment to a gathering like this would be profitless, so I shall desist. As a member, a charter member, and a director of the Napanee Horticultural Society, distinctions of which I am proud, I can speak authoratively as to the progress that organization has made in Napanee, and the benefit it has been to the individual members and the town as well. Through the energy and perseverance of Mrs. Wilkison, whose vegetable and flower gardens have been the objects of envious admiration for years, we sprang into being in December, 1894. Our first praiseworthy act was to become affiliated with this Association. For this I am sure you will at least give us praise. Those of us whose gardens are limited to a few square yards in summer and a flower stand in a south window in winter need instruction and advice in the culture of the few flowers which give us so much delight and pleasure. Most of the reading matter in your annual report and in the *Horticulturist* may be interesting to the fruit grower and doubtless is relished and enjoyed by him, but can't you devote a little more attention to the grower of flowers. It may be that we overestimate our own importance, but I leave it to you to decide as to the justice of our request. I am pleased to note that this year's program is more in harmony with the wishes of the floriculturist than those of former years.

To return to the working of our own society:—In the first place we pride ourselves in being the only society that is abreast of the times in having a lady President. We have not during the two years of our existence increased our membership very much. We now number about 70, but our zeal and interest in the cultivation of flowers has multiplied a hundred fold. The funds at our disposal, about $200, have been principally invested in the purchase of bulbs and seeds for distribution among the members, believing this method to be the surest way of inducing them to become practical In this we have not been disappointed. A friendly competition now manifests itself on every hand. One member who had never grown a flower before he joined the society, imported this fall no less than 2,000 bulbs from Holland for his own use. The fragrance of the hyacinth now

pervades a hundred houses, and bright blossoms adorn a hundred windows that two years ago were barren. Every member who has a few square yards about his lawn to spare has laid it out in flower beds, and now throughout the summer months gay and artistic bouquets are profusely arranged on hundreds of mantels where heretofore the cheerless bric-a-brac held sway. The contagion is not limited to individual members, but the town authorities, having a due regard for the new-born taste of the citizens for lawns and boulevards, are relaying the sidewalks nearer the centre of the street so that the driveways are narrowed, but the lawns extended. A neglected cemetery, which had degenerated into a veritable wilderness of weeds, has come in for its share of attention. It has been remodelled, all rubbish has been cleared away and what was formerly an unsightly mass of underbrush and weeds now slopes in graceful avenues to the river's edge, crossed by avenues and paths with beds of flowers on either side. The plots are being levelled and sodded, and tottering tombstones are being restored to their proper positions or new monuments taking their places.

The directors have had under consideration for some time plans for the opening of a public park in the heart of the town; which plans they hope to be able soon to carry out.

Most astonishing and satisfactory results have been produced, and a lively interest awakened in the practical study of botany among the students of the Collegiate Institute, by giving prizes for the best collections of classified and uniformly mounted wild flowers. The prize collections were donated to the Herbarium of the Institute. The first prize collection consisted of 126 neatly mounted and classified specimens.

One Sunday in the year we set apart as flower Sunday, upon which occasion we decorate every church in town, our efforts in this direction have been greatly appreciated.

Our grandest achievement was our first annual flower show held in the month of September, which proved a brilliant success. The display of flowers surpassed anything ever before seen in our town, both in merit from a purely floricultural standpoint, and in the exquisite taste manifested in the arrangement of the specimens. The show was held in the evening in the Town Hall which proved too small to accommodate the large audience. Want of room was our only draw-back. The stage was one mass of brilliant blossoms, through the centre of the hall were arranged pyramids of potted plants while every corner and unsightly projection was hidden behind a bank of flowers. From every gas jet and curtain pole hung garlands of green. The mingled fragrance of ten thousand blossoms filled the room. To a good-natured audience, made doubly happy through the medium of two senses, was presented a musical program to a third. This of course entailed a great deal of work upon those who managed the undertaking, but all felt amply repaid. The words of praise and encouragement they received spurred them on to continue the good work with renewed energy and enthusiasm.

This fall we imported 5,000 bulbs from Holland which were distributed among the members in addition to a generous distribution of bulbs and seeds last spring. We have met with success in the past and our future is bright and promising. We earnestly recommend the organization of Horticultural Societies in every unrepresented town in Ontario.

The SECRETARY: This subject of flower-culture is under consideration by us, and will be brought before the directors at their first meeting, and it is quite likely that the suggestions made by Mr Herrington will be followed up in a large measure, and we shall be able to devote a large space in the Journal to floriculture, or perhaps enlarge the Journal so as to include it, and we hope that our Horticultural Societies will themselves help to amend matters by contributing freely on this subject. They could give us their experience and help us wonderfully in making that department interesting.

## FRUIT GROWING AND DAIRYING.

By J. A. Ruddick, Dairy School, Kingston.

When your secretary did me the honor of asking me to prepare a paper for this convention, upon the relations between fruit growing and dairying, my first resolve was to decline, for I realized my inability to do the subject justice. When I noticed, however, that he asked me to merely lead off in a discussion, it seemed to make the way easier, and I am here to do what I can. My experience in growing fruit has been very limited. I may know something about dairying, having made it my life's work so far, therefore I fear this will have to be rather a onesided discussion as far as I am concerned.

What are the relations between fruit growing and dairying? Have the two lines of work anything in common? At first glance there may not appear to be much. I do not suppose that anyone present will disagree with me when I say that I think if a man is to make a success of fruit growing he must be possessed of rather more than average intelligence, for there are many things which he has to consider calling for a high order of judgment and much study in order to make the best of his situation. I may tell you also that the successful dairyman is a man who is able to do some clear thinking, and one who must ever be ready to adopt improvements in order to keep abreast of the times.

Both lines of work demand the exercise of considerable commercial tact and judgment in order to secure the best returns at the market end of the business. Both have many things to contend with, and while the fruit grower is fighting various kinds of insects and parasites which prey upon his crops, the dairyman is contending with insects such as the horn fly and other flies too numerous to mention, to say nothing of those minute forms of life which the bacteriologist points out as being so injurious under certain conditions to dairy products in one form or another. This is the spraying age, but the fruit grower must not think that he has a monopoly of it, for kerosene emulsion is highly recommended as a remedy for the horn fly and it is applied with the ubiquitous spray pump.

It seems to me that if a man possesses those qualities which enable him to make a success of fruit farming that he is eminently fitted to become a good dairyman, providing always that he has the special knowledge which is necessary to success in either line.

Speaking of special knowledge brings me to say that this is a feature of dairy work —and I think fruit growing also—which always appears to be a most encouraging one. Men usually get paid in some way or another for special knowledge if they exercise it properly, and there are certainly no other branches of farming to-day which offer a better field for special training and skill than do these two under discussion.

Seasons like the present, with its immense crop of apples and comparatively low prices, open up the question of utilizing the surplus or inferior fruit as food for milch cows. I am informed that large quantities of apples are being fed in Western Ontario during the present season, and it is reported that the flavor of the cheese is affected thereby in some sections. Fortunately, or unfortunately, I scarcely know which, we do not have many seasons like this one from which to draw conclusions, but one thing is certain, that apples can only be fed safely to milch cows in limited quantities. A few quarts at a time at first, gradually increasing to about half a bushel per day, is as much as a cow can assimilate without causing indigestion, and consequently a derangement of the nervous system, and thereby a decrease in the flow of milk and injury to the flavor of what is given. If it is true, as I am told, that some farmers are allowing their cows to run in the orchards and gorge themselves upon the fruit, I am not surprised to hear that bad results have followed. Any food, no matter how good, unless it comes pretty near being a balanced ration, if fed in excessive quantities, will produce the same deleterious effects.

Stewart gives the composition of apples as follows: Water 83.1 per cent., ash 0.4, albuminoids 0.4, fibre 4.3, carbohydrates 11 8, fat —, and the nutritive ratio 1 to 43; so that it is clear apples are far from being a balanced ration. It is quite safe to conclude,

however, that any bad effects which have resulted from the feeding of apples may be blamed to injudicious feeding rather than to the unsuitability of the food.

The feeding value of apples is considered to be about 13c. per 100 lbs. or 10c per bushel. To this, under certain circumstances, might be added the value of the element which we call succulence, but which is not taken into account by the chemist in his analysis.

Succulence in a supplemental food has very little value when the cows are on fresh grass, but, when the basal ration is a dry one, it has a very important effect in stimulating the flow of milk.

If I were engaged in fruit-growing and wished to add a line of dairying to my business, I should certainly go in for winter dairying. A few years ago, when some of the leading dairymen began discussing the possibility of carrying on the work of the dairy during the whole year, and when, in the fall of 1891, Prof. Robertson had two cheese factories in Oxford County fitted up for the making of butter during the winter, there was much speculation as to what the result would be, and not a few of the wiseacres predicted failure for the experiment. They have been disappointed, however, for there are to-day over one hundred winter creameries in Ontario and a great many in Quebec, and the number is increasing very fast. This surely demonstrates the practicability of producing milk and making butter during the winter season.

It has been shown in many cases that cows which come in during the fall will give more milk at a profit than those which come in during the spring. This plan brings the cows dry during the time that the fruit grower would be most engaged harvesting his crop, and would enable him to distribute his work over the whole year to better advantage than any other.

With improved facilities for handling our butter so that it may be placed upon the markets of Great Britain in the best possible condition, and greater attention being paid to that branch of dairying, there is likely to be a large increase in our output for several years to come, and it may not be long before Canadians are receiving as much for their exports of butter as they do at the present time for the cheese, which constitutes such an important item in the volume of trade with the Mother Country.

The PRESIDENT: The subject is a very interesting one for the farmers of this district, and I trust it will be thoroughly discussed.

The SECRETARY: It is claimed by some people in our section that when cows eat apples freely it dries up the milk to a certain extent. You do not think that is the case in ordinary quantities?

Mr. RUDDICK: If cows are allowed to eat apples to such an extent as to cause indigestion, the flow of milk will certainly fall off. Apples must be fed in small quantities at first and increasing to not much more than half a bushel per day. Indigestion causes a falling off in quantity and also in the flavor of the milk. Turnips are fed judiciously in limited quantities without any bad results, but if they are carelessly fed, the milk is entirely ruined by giving it that particular flavor which is so perceptible in butter and cheese. Various kinds of grain, by feeding in excessive quantities, will cause indigestion. A cow can only assimilate a certain quantity of feed. The trouble about feeding apples is that we know so little about them and are apt to make mistakes. We are accustomed to feeding grain and that sort of thing, and these grains come so near being a balanced ration. Apples are a very wide ration, being 1 to 13.

Mr. BOULTER: By experiment, we found that green tomatoes fed to cows will increase the flow of milk. We have actually had our milk come back equal to what they do in June in the highest flow of milk, and they are very fond of it; but we do not allow them to eat apples, because they nearly all dried up, eating in small quantities. Will feeding turnips after the cows are milked affect them as much as feeding them before?

Mr. RUDDICK: Decidedly not. I would not like to be understood as advocating the feeding of turnips to cows in any way, as it is too dangerous a practice. I do know that

turnips are fed without bad results at times, but it must be after milking and only in limited quantities.

Mr. BOULTER: If they are fed in the natural state, the cows eat them very slowly.

Mr. RUDDICK: I don't know that it makes much difference whether they are cut or not. I think milk takes the flavor of turnips by absorbing the odor if the milk is allowed to remain any time near where the turnips are. It is not quite clear as to how much milk will absorb those odors, but it is generally believed now that milk will absorb the flavor of ensilage. In any barn where there is silo there is more or less smell—not unpleasant—from the ensilage. In the early days the feeding of the ensilage was blamed, when the real cause was leaving the milk exposed to the odor of the ensilage.

Mr. BOULTER: My theory is that cows should have a dry feed in the morning before they are milked, then the ensilage following right after, with turnips, then a dry feed before they are milked.

Mr. CASTON (Craighurst): This year I fed apples to cows, beginning in a small way and gradually increased the ration till I got to half a bushel night and morning—that is, a bushel of pulped apples, mostly Russets. We had an increase of milk. I was pleased with Mr Ruddick's suggestion of winter dairying for fruit-growers, as we have a good deal of spare time in the winter and it would be a valuable side line.

Mr. GROFF (Simcoe): Don't you think a great deal of difficulty is caused by feeding sour and scrawny apples? I think the best authorities claim there is nothing equal to the carrot as a stimulant.

Mr. RUDDICK: It is a question of cost of production very largely. Carrots come rather expensive because you cannot get so large a crop as of some other varieties of roots. I am not able to compare the values of apples and turnips as a food. I think the apples if fed judiciously would be the cheaper food. I am satisfied all this trouble about the cows falling off in milk has resulted from feeding too largely at first. A farmer would think nothing of giving half a bushel of apples to the cows the first time they had any at all. That many apples given the first time would be almost sure to bring a fit of indigestion. To begin with a few quarts seems small, and the farmer would think it hardly worth while. The falling off in the flow and the injury to the flavor of the milk are both due to the same cause, I think; but I am not a practical feeder, and do not know anything of it from experience. I am not in a position to speak with any authority as to the comparative value of foods.

Mr. PATTISON (Grimsby): For the last ten years I have fed apples to cows every season, and I can corroborate Mr. Ruddick in saying that if apples are judiciously fed from the start there is no danger whatever in drying up the cows; indeed it increases the milk; but you must begin with a few quarts. I seldom feed as much as half a bushel at a time even after they have become accustomed to it.

Mr. RUDDICK: Half a bushel per day was what I gave.

Mr. BURRELL: There has been a long discussion in some States this year about feeding. Mr. Woodward suggests feeding apples in a small quantity, but they lay great stress on having them ripe and sweet. Where indigestion follows it is a good plan to give a pretty heavy ration of corn meal to counteract that.

Prof. SAUNDERS: I think the experience in Europe as well as in this country has shown that the feeding value of apples, looked on as a food pure and simple, is about the same as the feeding value of turnips; but there are other points about the feeding of roots and of fruits that have to be considered. We know ourselves that if we eat a little fruit sometimes before breakfast or dinner it gives us a better appetite for the other part of our meal, and we are able to eat and digest things to advantage that we could not do without that addition to our diet. I think it is the same with animals, and judicious feeding stimulates the appetite and promotes digestion away beyond what you would expect from the chemical constituents of those foods. That is an important point for the farmer to bear in mind; and variation in the diet of animals would no doubt help them.

Of course it must be done judiciously. To feed a cow with half a bushel of green apples would be the same as a boy eating too much green fruit ; it would result in internal disturbance and disorder. Every farmer must use his common sense and give judiciously. As to growing carrots, our crops this year at Ottawa, with those short white varieties and mammoth intermediates, have given us from twenty-eight to thirty-two tons to the acre, which is almost as large as our crops of turnips this year, and indeed larger than we generally have. I think the feeding value of carrots has been established by chemical analysis to be higher than any other root except sugar beets. At our experimental farm at Nappan they can grow thirty-five to forty tons of turnips to the acre with ease, whereas they cannot grow more than half that quantity of carrots. There turnips are the most profitable. We must all learn to think and act for ourselves and consider our localities and climatic peculiarities, and grow the best and most economical feed that we can produce, so as to bring down the cost of feeding as low as possible.

The SECRETARY : If the feeding value of apples is equal to that of turnips I think it is important for us to know it, because then we fruit growers do not need to go to the trouble of growing turnips at all, we have such a surplus of apples that are not fit to ship, and we are very glad if we can get anything like fifteen cents a bushel. I suppose that would be the value of turnips.

Prof. SAUNDERS : You would have to take about one-third of that.

The SECRETARY : If we can get even seven cents or ten cents in feeding value we ought to be satisfied.

Mr. BOULTER : The apples would not last as long as the roots would to feed.

The SECRETARY : They could be kept very well till the spring.

Mr. PATTISON : I think if they were stored in pits they would keep very well.

Mr. E. D. SMITH, Winona : It seems to me that the two branches of farming—fruit growing and dairying—are intimately connected in this way : That the fruit grower requires large quantities of manure, and that by keeping cows in the winter particularly, and utilizing them in the way that most of the work comes in the winter, by butter-making, he will divide the work up, and at the same time get manure in the cheapest way.

Prof. SAUNDERS : We know that the apple in growing the food makes a heavy draught on the soil for potash, and the cow would not utilize any part of that potash, but it would all go back to the soil for manure. That is also a point worth mentioning in maintaining the fertility of the soil of orchards.

Mr. PATTISON : The feeding of milch cows in winter would involve the growing of a great deal of bulky fodder, if not hay at all events some other form, which might be coming at a time when they would be busy in the orchard, and involve considerable difficulty in harvesting it.

Mr. CASTON : I think that would be largely solved by growing corn, of which you can grow on a small piece of ground enough to feed a great many cows during winter ; and that would be a valuable way of getting manure. Where large areas are utilized for fruit growing how do they manage to get manure? I am only growing in a small way, and one of the most troublesome questions I have is to get hold of enough manure. I utilize commercial fertilizers, but it is very costly, and it is a question whether the game is worth the candle.

The SECRETARY : Fruit growers don't keep up the fertility as they ought to.

Mr. E. D. SMITH : That is so, they have not kept up the fertility. In the first place the fruit in the Niagara district is usually planted on extremely good soil. So far they have not been compelled to set it on poorer land. Ultimately they will.

The SECRETARY : The land will all get poor, under present treatment.

Mr. E. D. SMITH : No doubt it will. Of course our experience with grapes is that they require very little fertilizing if set on good land for a great number of years. No

doubt ultimately they will play out. We use large quantities of ashes. We have been able to get all the ashes we require delivered on the land for ten cents a bushel, and we consider that a very cheap means of getting potash. To produce fruit requires usually a very little nitrogen, and so far we have been able to get it. Some keep cows during the winter; others let the land go poor, and a good many are buying from Toronto this compost, mixed manure, which costs about $1.25 a ton laid down at the station. It is quite expensive, but those who have tried it think it is more economical than the artificial fertilizers, which are rather costly, though I believe ground bone where the phosphates are required—and that is the main thing—is the cheapest available supply. I know one or two cases of vineyards that had got to that position that they grew plenty of wood but did not produce any fruit. A good strong application of bone meal in a year or two produced splendid results; the old crops came back again.

The SECRETARY: Have you noticed any special instances of the effect of using ashes on your soil in connection with any of your crops?

Mr. E. D. SMITH: The best results with ashes have always been upon sandy ground, I presume because the potash leaches quicker out of the sandy ground. The application of ashes almost always produces quick results on sandy ground, especially for peaches.

Mr. PATTISON: I have had some little experience in the matter of fertilizers and keeping up orchards. I make it a rule not to grow a great quantity of fruit, but to keep what I do grow well manured all the time. It is possible to keep up a moderate sized apple orchard without a great deal of manure. If your orchard is fenced so as to keep pigs in, and you feed the pigs besides to some extent, the pigs not only improve the orchard but they keep up the land, and a very moderate quantity of manure applied around the trees about once in three years will keep the orchard in excellent condition for years if the land is fairly fertile to begin with. In the matter of other fruits, a good way to supply nitrogen is to sow rye or clover and plow it under before coming into bloom, or when it has got considerable length of stock. That not only supplies considerable manurial elements, but keeps the land in good mechanical condition. I have tried commercial fertilizers, and found them profitable with plums.

Prof. SAUNDERS: What particular fertilizers have you tried?

Mr. PATTISON: I have chiefly tried the Smith's Falls fruit tree fertilizer, and found it a very excellent thing for plums and peaches. My soil being clay, wood ashes are not much needed, though I think an application occasionally is a good thing even on a heavy soil.

Prof. SAUNDERS: This question of the fertilizing of orchards is very important, especially in those districts where manures are hard to get. Potash can nowhere be got more cheaply than in wood ashes at ten cents a bushel. Wood ashes contains from five to six per cent. of potash besides about two per cent. of phosphate of lime. Where ashes cannot be got, kainit is a good fertilizer, containing twelve per cent, and it can be imported from Germany at reasonable rates. Phosphoric acid can be supplied from ground bones, and also from the ground phosphatic rock. There is a third source of this important element that has come to the front in late years, that is known as the odorless phosphate, or Thomas' slag, which contains a large proportion of phosphoric acid. This is a waste production in connection with iron lands. This waste is got by heating the iron ore to about 5,000° F., when a small proportion of phosphorus combines with the lime and forms phosphate of lime. This product was thrown away at the mines until it was found to contain about twelve per cent. to fifteen per cent. of phosphoric acid, and it has now become a large thing in fertilizers, and from three to five thousand tons of it are used in Germany every year in fertilizing lands, and its use in this country is increasing very much from year to year. We have tried it at the experimental farm at Ottawa and have had some perceptible results; but in the use of artificial fertilizers it is not always easy to see the results immediately. Sometimes the season is not favorable for the particular crop, and then the farmer is very apt to form a judgment adverse to the fertilizer, when probably the larger part of that fertilizer is stored in the soil awaiting use in subsequent years. It is a very difficult subject, indeed, to form any very positive conclusions about, but I

think we have evidence enough to see that whenever potash or phosphoric acid is added to the land, if the addition is not used during the following year it is used in subsequent years, and it remains stored up in the soil, taken up by that peculiar quality which enables soil to retain potash and phosphoric acid and yield it for future use. In regard to nitrogen, which is the most expensive of all the elements to supply, I think there is no way in which the orchard can be enriched with that element so quickly as by sowing crops of clover or peas or some other leguminous plant, and plowing it under. These plants have the power of taking nitrogen from the air and storing it up in their tissues, which rye and buckwheat and others have not the power of doing. These latter plants only giving back to the soil what they take from it. (Applause).

Mr. BURRELL, St. Catharines: There is a very important feature of kainit that should be mentioned—its value as an insecticide as well as a fertilizer.

## ELECTION OF OFFICERS.

The election of officers was then proceeded with, and resulted in its unanimous return of the persons whose names are given on page 2.

## TREASURER'S REPORT, 1895-6.

Mr. WOOLVERTON read the Treasurer's report as follows:

RECEIPTS.

| | $ | c. |
|---|---|---|
| Members' fees | 2,581 | 62 |
| Government Grant | 1,800 | 00 |
| Advertisements | 356 | 32 |
| Binding and bound volumes | 20 | 60 |
| Sample copies, etc | 6 | 88 |
| Amt. due Treasurer, Dec. 1, 1896 | 41 | 25 |
| | $4,806 | 67 |

EXPENDITURES.

| | $ | c. |
|---|---|---|
| Amt. due Treasurer, Dec. 1, 1895 | | 38 |
| "Canadian Horticulturist" | 1,854 | 69 |
| Sec.-Treasurer, Editor and Assistant | 1,200 | 00 |
| Commission | 342 | 48 |
| Affiliated societies | 225 | 63 |
| Plant distribution | 221 | 04 |
| Directors' expenses | 198 | 13 |
| Chromo lithographs | 190 | 52 |
| Postage and telegrams | 135 | 56 |
| Reporting | 122 | 34 |
| Express and duty | 99 | 43 |
| Printing and stationery | 71 | 82 |
| Committees | 39 | 97 |
| Bookbinding | 30 | 55 |
| Discount | 26 | 48 |
| Auditing | 20 | 00 |
| Advertising | 15 | 70 |
| Illustrations | 7 | 95 |
| Care of rooms | 3 | 00 |
| Exchanges | 1 | 00 |
| | 4,806 | 67 |

A lengthy discussion then took place on the above report, especially in regard to the items "Commissions," "Printing of *Horticulturist*," and "Premiums." After many suggestions had been made and opinions expressed, it was decided to appoint a committee to consider the matter and report to the Society. The committee was then appointed, consisting of Messrs. Groff, E. D. Smith and Pattison.

## REPORT OF FINANCE COMMITTEE.

Mr. ORR read the report of the Finance Committee, which was adopted on his motion, seconded by Mr. A. M. Smith.

We have examined the Secretary-Treasurer's books and vouchers and found them correct, and that the expenditures are in accordance with the objects of our society.

We are highly pleased with the convenient, careful and complete manner in which the books are kept.

W. M. ORR,
A. M. SMITH.

## ADDRESS BY THE NEW PRESIDENT.

President W. E. WELLINGTON was then introduced as the new President, and took the chair amid applause. He said: I think I am duly sensible of the honor you have conferred upon me in electing me President of this Association. I regard it as an institution for great good. As to the extent of good that we shall bring about, the matter is in your hands. I was very much impressed with the good which the institution has done by the optimistic paper which was read yesterday (laughter). I prefer to take it in that light, as Principal Grant did. I think that the future of the fruit grower is one that need not give him any particular concern or worry. He will have his ups and downs like other men in business. In the past it has been very easy sailing. It was simply a matter of growing the fruit and turning it into good dollars, but of course with the larger extent of planting, there has come about a revolution to a certain extent in the fruit grower's business as well as in other people's. Now, fruit growers who adapt themselves to circumstances are the men who are going to succeed just as they will in other lines of business. I think that this institution should under the altered circumstances give particular attention to the present needs of the fruit grower. I would like to see committees appointed immediately to look thoroughly into the matter of packing and placing fruit on the market. I am satisfied that that is one of the main causes of the losses that have been sustained. True, we have had an extraordinary crop in some things, but that has only added to the difficulty I have mentioned, that is, that fruit is not properly put up as a rule. You may go into Toronto and other markets and in nine times out of ten the package that you buy will be disappointing, It does not run through as it is on the top. While there are many honest packers I am satisfied that there is need for great change in this direction. I am almost persuaded that legislation is necessary to compel men to place packages on the market so that when they do not put up their fruit properly they can be traced, and those who do put up the fruit properly will get the benefit of this honest dealing (Hear, hear). I am satisfied that the honest dealer suffers because of the dishonest dealer. It drags the price of fruit down, and the honest packer becomes discouraged because he does not get the returns that he naturally should expect from his honest endeavor. Then another matter that we should take hold of and seriously consider is that of transportation. I am satisfied that we pay too much for the transport of fruit to the market. I am satisfied that there is a good market for many kinds of our fruit in the northwest, but it is prohibited simply because of the heavy cost of transportation. The same thing applies to the transport of fruit to Great Britain. Then we come to the great necessity of some radical change in the matter of the disposal of fruit after it has got to Great Britain. I am satisfied, to speak plainly, that there is a great deal of roguery and robbery committed on the shippers of fruit to Great Britain. There is too much of this "slack and wet" report, and somebody is getting the benefit of it, because I am satisfied that fruit does not always reach the market in the condition in which it is reported. There is an unlimited market in London alone, and I think Mr. Shepherd will bear me out in saying, if you can only bring your fruit before the consumer and more into his notice. At this stage, gentlemen, I do not want to take any further time, but I merely mention these points for your consideration,

and hoping that I shall have the assistance of every member and the directors of this society in seeing if an improvement cannot be brought about by the aid of the Association (Applause).

Mr. HUGGARD: It affords me very much pleasure to move a vote of thanks to our retiring President. He has officiated over this Association for the last two years in such a way that it has been pleasing, not only to the directorate, but to the public at large. His re-election last year was a very happy reflection on his career the year previous, and there were many expressions of gratitude.

Mr. CASTON had very much pleasure in endorsing the mover's remarks and seconding the motion.

The PRESIDENT stated that he thoroughly agreed with the motion, which he conveyed to the retiring President.

## PACKING AND SHIPPING OF OUR CANADIAN APPLES.

BY C. H. WARTMAN, KINGSTON.

I have had an experience of sixteen years as a packer and shipper of Canadian apples to various parts of England and Scotland, and although I have gained many points of practical knowledge, still I find there is room yet to learn something of this trade, as to how to handle and when to handle this wonderful commercial product, the apple. I have crossed the Atlantic six times in pursuit of knowledge on this subject, with apples packed by my own hands, and although some of my apples have sold as high as 28s. per barrel, a very large percentage have brought very much less, and to-day, after this long experience, I find myself financially about as I started. Nevertheless I have gained a knowledge of kinds to ship and the manner to pack that may be of great benefit to me in years to come, and I will gladly try in this paper to impart some knowledge to my fellow packers and growers of Ontario. My experience in packing apples for the British market over 3,000 miles away, has always been in barrels, and its in the first place necessary to procure barrels that will not weigh less than 165 lbs. gross for Spy, Russet, Baldwin, as we know these are among our heavy apples. As apples are all sold by weight in England they look for this weight in a Canadian barrel. I believe we have a standard for our Canadian coopers to go by, but find the coopers that make the smallest barrel to have the largest sale—not knowing the mistake they are making. We have to cater to the wants of English consumers. In our general Canadian apple barrels the staves are too thin, the heading is too thin and the hoops too few. I strongly advise four hoops on the body of the barrel instead of two, so that if two should break there are two others left to hold the barrel in its solid position without expanding, whereas if there are only two and one breaks, it allows the barrel to expand, and after a little rolling it becomes slack.

We shippers know a little about "slack and wet," and "wet and slack." It means anything but profit. As to packing apples for export: In the first place I would have the apples picked as they come from the trees, but in barrels drawn in some airy, cool building to stand four or five days to sweat and shrink. Then pour out on a packing table or on some blanket placed on a clean bed of straw on the floor, so they will not be bruised. As one lot of men get tired of one position they can exchange positions, as the most easy position will become tedious after a few hours' work. In this way you will get more apples packed and not feel so weary at the end of your day's work. I believe in coursing the barrel two courses with average size apples—not the largest that can be found, but a good fair average. Then pour in the balance out of a good sized basket that will nicely turn in the barrel, giving after each basket, the barrel a good lumber wagon shake, if you can understand this. Never failing to do this on something solid, as this is partly the secret of tight and well packed apples. Now as to the exact fulness of the barrel to press, this would depend whether they are shrunk or

fresh off the tree, but in all cases have the barrel pressed tight enough to carry through without slackness, or one-fourth of the barrel will be disfigured with bruises which hastens decay. Although apple salesmen in England say no package is equal to the barrel, I am of the opinion before many seasons roll around a large portion of our apples will be exported in boxes, which will not need to be pressed in so tight as to make our beautiful apples look unsightly and cause decay. Some cannot understand why so large a percentage of our apples arrive slack and wet in England. The cause is largely due to the rough handling they get in transportation. While watching apples transhipped from boat to cars, I have many times been grieved to see them so roughly handled, and have devised a plan whereby labor could be saved and apples could be saved from destruction; but all my work has been in vain as yet. I claim no barrel of apples should drop one inch, as a barrel weighing 165 lbs. will not stand continual drops from gangway to dock and from carts to solid pavements. Where barrels are piled two deep on ends it is not necessary for a man to lift this barrel, but ease it down. All steamboats and freight sheds should be made by law to carry or have on hand at every transhipping place large linen sacks filled with sawdust for these barrels to fall on, where there is any likelihood of any fall whatever. This provision would cost a very little and growers and shippers would reap the benefit. Let one line of boats or railways adopt this plan and others will have to follow suit or lose their apple freight, which is of no little importance.

## PICKING, GRADING AND PACKING APPLES.

By L. Woolverton, Grimsby.

There is no question that the fruit industry is one of the most important industries in our province. So rapidly has it developed in some sections of late that the income so derived far exceeds that from any other part of the farm. All this is in spite of the many disadvantages under which fruit-growers often labor, and it is to point out a remedy for these that I write this paper.

The first means of aiding in the development of the apple industry is by *imparting information concerning profitable varieties.* Many of our orchards are full of worthless varieties, fit only for cider. The trees occupy the same space as good varieties, and they cost as much to cultivate and prune; the fruit costs as much to harvest and market, besides glutting the markets and giving our growers a bad reputation, while the margin of profit, if any at all, is the very lowest possible. What do we constantly hear from British salesmen? "Good, sound winter apples wanted: no sale for inferior trash." Second grade apples should not be exported at all, even if of a good variety, and inferior varieties should be top-grafted to those which are most profitable. "Which are these?" is the question always coming up. In this paper I will not discuss this point. In fact, it is a wide question, for every section has varieties suited to it, varieties whose home seems to be there and which succeed nowhere else as well. Two questions, then, have to be studied—(1) the varieties most wanted for the market, and (2) the places where each will succeed.

The first of these questions can only be answered by studying the markets. For instance, this very year, in October, there came the following cable:—"Latest prices for Canadian apples at Covent Garden per barrel are: Kings, 12s. to 16s.; Greenings, 9s. to 11s.; Baldwins, 10s. to 10s. 6d.; Ribstons, 13s. to 15s.; Snows, 9s.; Twenty-ounce Pippins, 9s. to 11s.; Seeks, 9s. to 10s. 6d.; Fallawater, 10s. to 11s. 6d.; Golden Pippin, 10s. 6d.; Blenheim, 11s. to 12s. 6d." The King stands first in this report, Ribston and Blenheim second, then Twenty-ounce Pippin, Baldwin and Greening, and the Snow last.

But when you study these varieties in our orchards, you find the King a poor bearer, Twenty-ounce no bearer at all, I might say, Ribston a weak grower, and the Snow, in southern Ontario, too early in ripening. Thus the one study modifies the other. There is another apple, for instance, which is taking a front place in the British apple market—the Wealthy. This variety has been sold in Scotland for the writer at

17s. 6d., or about $4 30, per barrel this season, when those markets were fuller than ever they were before of Canadian apples. It is everywhere a beautiful apple, perfect in form, beautiful in color, and of excellent quality. It succeeds best in our northern sections and will succeed almost everywhere. Why should not more be grown, instead of the many unsalable varieties now being grown.

We are glad that both the Dominion experimental farm system and the Ontario fruit experiment stations are doing so much to find out the best varieties and the sections for which they are best adapted. Our Ontario Fruit Growers' Association reports will soon become a mine of wealth to every fruit grower. We do not in this paper intend to touch upon the importance of publishing reliable information to fruit growers regarding the methods of planting, cultivating, fertilizing and pruning fruit trees and plants. These are all important, but they are being well and faithfully treated by the Ontario Fruit Growers' Association through its meetings, reports, journal, lecturers, etc

But there is room for vast improvement along other lines also which count very high in making fruit-growing profitable. First, the *gathering of the crop* Most orchardists do not begin early enough. They will wait until October and then find one-half of their best apples on the ground before the work is done. A neighbor of mine had this year a crop of about two thousand barrels of fine Baldwins. He did not begin until October, and then leisurely picked up the fallen apples before picking from his trees. Toward the end of the month one-half of the crop was on the ground and too much bruised to ship.

In a year like this it would pay to leave all the small and inferior apples unpicked and gather only the best. I ventured this year to ship about fifty barrels of second size, but otherwise first-class, Baldwins to Edinburgh and received a cable to say that they were useless and would hardly bring expenses. Trees that bear small apples should either be cultivated and manured until they bring large fruit, or else top-grafted to large, fine varieties that would pay for handling. There is a great difference in the season of maturity on the trees of our commercial apples, and we would pick them in about the following order in southern Ontario:—Colvert and Gravenstein, 1st of September; Kings and Greenings, 20th to 30th of September; Snow, Wagener and Wealthy, 1st of October; Russet and Baldwin, 1st to 15th of October; Spy, 15th to 30th of October.

Of course it goes without saying that the fruit grower who wishes to make a name for himself must have every apple picked and handled like eggs and not like potatoes, for every tiny bruise tends to make the fruit second grade. On this account, we fear the Yankee picking machines will never answer.

The next important step in helping to develop the fruit industry is *proper methods of grading and packing.*

There is a common notion that apples should lie heating in heaps for some days before packing, but this is a mistake, for in this way they are made to ripen too fast. They should be packed as soon as picked and hurried away at once to some cold storehouse, if the best results are to be expected, so that their first crispness may be retained. My plan this season was to take my packing table out to the orchard and on it the pickers emptied their baskets as they picked, and the apples were at once packed and teamed away. In this way, one man, with a little assistance, will sort and pack for five or six pickers, and several gangs may be sent out if necessary. The ordinary first grade stock should go in barrels, and fancy apples in smaller packages, as the half barrel or the apple case. This fancy stock is picked off the packing table and sent to the packing house where women are employed to wrap in thin manilla paper and pack for a special trade. Now, if this class of apples could be stored in cold storage warehouses safely and exported just when each variety is most wanted, at the best prices, a great step would be taken toward developing the fruit industry of Canada.

Really the most deplorable ignorance exists in this *work of grading apples*, or else the utmost carelessness. "Canadian" stamped upon them is an important aid in selling many of our goods in Europe, but, unless the contents of the package is creditable, no

such stamp should appear. It is astonishing the mixtures that are sent forward as No. 1 apples. Large and small mixed together, wormy, knotty, scabbed, all in one package and sold as No. 1 grade. Sometimes even these are faced up with real fancy apples and sold accordingly to the great after-disgust of the buyers. We noticed in a Toronto paper this statement: "Dealers buy and pack the barrels themselves, so that the old country market shall not be destroyed through the offering of inferior fruit." We question whether dealers are more reliable packers than the growers. We know of some who constantly practise facing up with an entirely different grade of apple from the contents; and we know of plenty of growers who pack honestly.

But ideal packing has, as yet, been scarcely thought of in Ontario. We need to take some lessons from our California friends with whom packing is a business, and who do not hesitate to pay packing companies a certain price per package for grading and wrapping their fruit ready for distant shipment. Mr. R. J. Shepherd, of Montreal, has done something in this line with his Cochrane case, and Mr. G. E. Fisher, of Freeman, with his graded apples, but the mass of Canadian fruit growers have not begun to consider the importance of grading. Large and small apples should never go in the same package. Indeed small apples ought not to be shipped at all.

The same may be said of pears. They should always be turned out on a packing table, and the large and small sizes separated from each other. The French people put up Duchess pears in cases containing from forty to forty-eight, and these sell in Leeds, England, at from $1 to $1 25 per case. Of course, each sample is wrapped in manilla or tissue paper, and some packing material is used to keep the fruit from moving about in the case.

We tried separating our peaches in this manner last season, putting the large ones of uniform size in special six quart baskets made for our special use. Thirty-six filled the basket, and in the case of the very largest, half that number. The second size was packed in twelve quart baskets. We noted the result, and found that the half-basket of No. 1 sold for exactly the same price as the large basket of No. 2.

Then transportation and cold storage facilities are needed to encourage and develop our fruit industry. I shall not say much upon these topics, because other gentlemen are present who have thought further along this line than I have done. I simply wish to draw your attention to the fact that California peaches and pears have this season been put through all the way to England, nearly 5,000 miles, and have arrived in excellent condition, and that at very low rates.

If we could have increased facilities, we could often save ourselves from disaster in years of plenty by sending our surplus pears, peaches, grapes and tomatoes to England. Our fine Red Astrachan and Duchess apples also could go forward and bring us excellent returns. And not only to England, but to much more distant countries. A neighbor of mine is trying the exporting of Canadian apples to South America, with some encouragement. I am assured that New Zealand would pay a high price for our Canadian apples, and I know from my own experience in 1895 that Australia wants Canadian apples in their spring months of October, November and December, and would pay from three to four dollars per bushel for such showy varieties as our Cranberry Pippin, providing we had some means of conveying them in cold storage chambers through the tropics. My shipment in 1895 failed on this account. I would have tried again in 1896 had I assurance of proper cold storage, but this I did not have. On the 24th ult. I received the following letter from Mr. J. S. Larke, Dominion agent at Sydney, New South Wales: "The Canadian-Australian steamers are equipped with excellent cold chambers, which they can maintain at any temperature. It is essential that the quantity shipped should be sufficient to pay for refrigerating a chamber. I fear the overland charges will be too great for the shipment of fruit from Ontario, save in exceptional seasons, but I look to its being a regular business from British Columbia in the future. The next steamer is bringing, I understand, fifteen tons of onions from Vancouver. These vegetables are worth $60 to $65 per ton here just now, and accordingly there is a fine profit in producing them in B.C. at such prices. Potatoes could be shipped here just now likewise On the other hand there will be times when they will go the other way, It will be a mutual

exchange to the advantage of both, inasmuch as it will improve the prices just when the British Columbia farmers will have an abundance to sell."

Perhaps we may get safe carriage to Sydney, via London, yet, on such terms as to make Sydney one of our apple markets.

Now is the time for us to give our best attention to the subject of cold storage, because the Minister of Agriculture for the Dominion is prepared to do anything in reason for our advantage along this line, providing we can formulate some sensible and practical scheme of operation. In proof of them, I have received the following letter from Mr. J. W. Robertson, dairy commissioner, Ottawa, and which you will see refers to another letter from an experienced fruit grower :—

"The plan proposed by the Minister of Agriculture to arrange for cold storage service for perishable food products from the producers in Canada to the consumers in Great Britain includes a desire and intention to do something towards providing necessary cold storage warehouses for the preservation of fruits.

"It is believed that the period of consumption and of profitable market demand might be extended for two or three weeks in the case of many of the perishable summer fruits, and that large fruits for consumption during the winter and spring months could be kept in better condition with less loss, in suitable warehouses than when stored in haphazard places, as if too often now the case.

"Do you think it probable that a number of fruit growers in several different districts would form themselves into joint stock companies, for the purpose of erecting and operating district cold storage warehouses for fruit? I think a building sufficient to hold 25 car-loads could be erected and equipped with the requisite mechanical refrigerating plant at a cost of between $5,000 and $6,000. The charges for the storage of the fruit, when the warehouses were at all largely used, would yield a revenue sufficient to pay the operating expenses and a fair interest on the investment.

"Would a guarantee by the Government of say 5 per cent. on the cost of the cold storage warehouses for three years, in case they did not earn enough to pay 5 per cent. dividend, be a sufficient inducement?

"Do you think help by the Government can be given in any more effective way, so as to bring about the erection and operation of these warehouses? I shall be very glad to receive your opinions and suggestions on the matter; and, if you think it desirable, you might call for an expression of opinion from leading fruit-growers through the columns of "The Horticulturist."

You will also be interested in the opinion of one of our leading fruit growers and shippers in southern Ontario. I wrote Mr. E. D. Smith, Winona, placing the matter before him and asking his opinion, and have received the following reply:

"Your esteemed favor to hand asking if the Government should further a scheme for the transportation of fruit in cold storage to Britain, would a stock company, with a capital of $5,000 or $6,000 be likely to be formed at Winona, if guaranteed interest at 5 per cent. for three years. I scarcely think so until the success of placing our perishable fruits on the English market has been more fully tested. My idea is this, if suitable storage warehouses were erected in Hamilton, and possibly another at St. Catharines and tests made for two or three years to see if the British market will take our fruits at profitable prices, whether they can be landed there in sound condition by this system, then, if successful, there will be no difficulty in having storerooms built at Winona, and, I fancy, almost every station along the line, if necessary, but for purposes of experiment, it seems to me that the fresh fruit could be loaded directly into the cars at the stations. It seems to me that the essential point is to get proper dry cold storage between here and Montreal and between Montreal and the port of debarkation and again immediately it is landed there with as quick change as possible from cars to boat and from boat to storage house. Growers would not care to put money into anything of that nature when a test could be made without this money being put in. I have every faith that we can grow in this Province of Ontario thousands of barrels of Bartlett pears, Anjou pears, and, I believe, Clapps Favorite pears, and put them on the British market with cold storage and get handsome returns, but the system must be perfect. There would be no trouble in putting it on the cars in perfect condition. As for grapes, all they require is cool, ventilated chambers, perfectly dry, with a temperature of about 40 degrees, although I am satisfied that they will carry perfectly in a temperature of about 50 or 60 degrees, if there is a good circulation of pure air, and I still have faith that, if persisted in, our Black Rogers grapes especially will find a good market in Britain, and these varieties can be grown almost, if not quite, as readily as any other sorts. I see no reason why, with proper cold storage, too, our peaches could not be landed there and compete with California peaches. Trusting some thing may come of this scheme, I am, yours truly, E. D. Smith."

One more important means of developing the fruit industry to be brought before us by gentlemen present, and that is the establishment of a fruit depot in London, England, for the sale of high-grade Canadian fruit. This should be inspected by a Government Inspector, and duly branded "Grade 1," with an object of creating confidence in Canadian apples and other fruits. I shall not trespass upon the important theme, but leave it for others more experienced to bring it before the meeting in an intelligible and practical manner. Hoping these hints may lead to some results favorable to the development of one of the most important of Canadian industries, I will close this rambling paper.

The President: Now you have heard read these two important papers and I hope that we shall have a discussion on them that will bring out points of interest to the

Hon Mr. Fisher, Minister of Agriculture, who is present, that he may see the wants of the fruit growers regarding the shipment of fruit to the old country. Certainly one of the most important points that we have now under consideration is the placing of our fruit in a perfect condition on the British market, which is practically unlimited.

Mr. W. E Fisher: I would like to ask the writer of that paper if he has had any experience of wrapping apples in paper and shipping them to the old country. I did that and received very little encouragement. The best that we obtained for apples beyond what we obtained for them without paper was from 3d to 6d for 50 lb. boxes. They wrote me that was the best they could possibly do, and that won't pay us.

The Secretary: Certainly that would not pay, because it is worth 3c. a box to do the wrapping, and the paper I suppose would cost as much more; but all that I have shipped have been wrapped. I shipped 500 cases last year and the same this year wrapped, and I put in about a dozen this year unwrapped just to compare notes.

Mr. W. E. Fisher: What does it cost to put this California fruit on the British market?

The Secretary: I cannot give you what it costs, but they get very low rates, probably very nearly as low as we do.

Mr. Huggard: I do not think it is of much importance that we should wrap our fruit in tissue paper to get it to England, in fact I feel rather opposed to it on account of certain changes that take place in the atmosphere during the voyage across; but if we had cold storage, that is, an even temperature to retain the air during the voyage across the Atlantic, our goods packed in our ordinary barrels, or perhaps in barrels made a little better, they could be laid down in the European markets just as perfectly as they leave the Canadian shores. I have had some little experience in that line. I sent some down to Florida by rail on two different occasions to a relative, and they arrived there in just as good condition as he ever saw them here, no damage whatever. On one occasion they were some four weeks on the road. I am satisfied that if our transportation companies were to reduce their rates a little, perhaps put on fast steamers and give us cold storage, that we could place our goods to compete with any nation in the world, in the European markets, and get better returns than we have been receiving for our crops heretofore.

The Secretary: The advantage of wrapping is that if there is one spot of decay that might be in contact with another apple, the wrapping would save that contagion.

Mr. Daly: What is the Secretary's experience as to the prevention of wounds, bruises, etc., in the handling? Does the wrapping protect them in the handling better than those unwrapped?

The Secretary: I don't know that it would very much. The great point is to get them snug so that they won't move in the cases. I presume that could be accomplished without wrapping.

Mr. Caston: There must be a good deal in the temperature while they are on the Atlantic steamers. If the Australians can bring them through the tropics, a much greater distance, and land them in the old country, surely we ought to be able to do it. Where does the difference lie? We came across a steamship agent coming on the train, and he said the steamship companies were altogether independent of the apple trade this year. Is there sufficient competition? If there is, they will compete for this trade. Then another admission he made to us was, that if there was a great rush of freight, they were in the habit of putting it down in the hold, and placing it near the engine and boiler, where it was very warm. There must be something radically wrong with the placing of the fruit on the way across the Atlantic. Fruit that is grown in a dry climate will certainly travel better than in a moist country like ours. The blame is generally laid on the packer, but surely it is not all owing to bad packing, and what we want to get at, is how to remedy the evil in the best way.

Mr. WARTMAN: Two years ago I was on a steamer on which I had 3,400 barrels of apples, and I was very anxious to see them unloaded down into the steamer. I saw several picking up apples and throwing them into salt sacks, and where the salt sacks went I could not say, but they could not get them back in the barrels again because we put them in so tight. When they burst open and run all over the decks they throw them into salt sacks.

Mr. DEMPSEY: I have not had as great experience in shipping probably as Mr. Woolverton. I have been successful so far; whether it was successful packing or what, I do not know. They have turned out well. During last winter the largest number of slacks was about 5 barrels to the car.

The PRESIDENT: Probably you could throw out some suggestion as to the way in which you pack.

Mr. DEMPSEY: I think I pack about the same as Mr. Woolverton, only I do not pack and ship in the fall. My packing is nearly all done in barrels, and I ship the whole winter through to March, with the exception of December and January.

The SECRETARY: You store your apples and ship them through the winter as the different varieties are wanted?

Mr. DEMPSEY: Yes, I ship all the early fruit off before December, and the other fruit I hold till after the holidays and ship it the last of March, and the last of March shipment has always been the best.

The SECRETARY: At what temperature do you keep your apples?

Mr. DEMPSEY: I try to hold them at 26° to 30°.

Mr. JONES: How do you hold the temperature down in the fall?

Mr. DEMPSEY: I cannot till the frost comes.

The SECRETARY: Would it be any advantage to you if you could put them in cold storage in the fall?

Mr. DEMPSEY: Judging from the way the Spys kept during the past winter I could not say it would make any difference had they been in cold storage in October.

The SECRETARY: In what order do you ship your apples?

Mr. DEMPSEY: The last I shipped was Ben Davis. The first variety was Wealthy. I shipped them the 20th of September; then the last of September I shipped Snows, making about three shipments of Snows, and then Kings.

W. E. FISHER: I would like to know what it costs to store fruit in cold storage in cities in the old country, because if we can get cold storage there at a low rate, I think it will be better to ship our fruit promptly, put it in cold storage and hold it there for a late market, than hold it here and ship it after the new year; it would carry better.

The PRESIDENT: We were to have had a paper from the Honourable Mr. Sanford, of Hamilton, on establishing a Canadian Food Depot in London, England, and Mr. Jones, of Toronto, was to have given us a paper on storage, but neither of the gentlemen is present.

Mr. BOULTER: I have always taken exception to growers packing their apples and then complaining of the results. My experience is that a man can pack apples for his neighbor first rate, but as soon as he begins to pack his own crop, they never turn out well. Let a man put his name on every package of goods that he packs, and if a customer buys one poor article it is his fault if he buys a second. We have a law that if a man puts up canned goods and does not put on his name, he is liable to $2 fine for every can without his name, and the retailer is liable to $2 fine by the poor consumer that gets hold of him. I believe that the unfortunate prices of fruit to-day result from careless packing. I would like to see a fast steamship freight service. There are more cold storage houses in Ontario than there were ten years ago. In our county, Prince Edward, the amount of apples being stored and shipped by refrigerator cars in winter time is wonderful. I doubt

if you could succeed with cold storage in England. Keep the apples here until the better market is obtained in England. Last year I shipped 700 barrels to Prince Edward Island. I said to the largest wholesaler in Charlottetown: "You can get all the apples you wish from Annapolis Valley: they grow the finest Gravensteins in the world." He said, "Yes, but no apples are like the Ontario Spys and Baldwins, and other fine varieties, and they always command a better price, but I want you to put all the big ones by themselves, and if you send small ones, put the small ones by themselves." (Laughter.) The finest apples to-day that this world produces can be grown in Ontario. (Hear, hear and applause.) We, who are shippers, know that Ontario apples bring better prices when they are right, than any other apples grown on this continent; and I would like to see our apple industry fostered and looked after, and shippers impressed with the necessity of putting up only first-class goods.

Mr. DEMPSEY, Picton: I am sorry that Mr. Boulter has found so many poor farmers down in his section. In our section it is quite different. Some farmers were indnced by a prominent apple shipper to have his men put up the apples and they would pay 25 cents a barrel for the putting up. One neighbor had his done up, some 26 barrels, by these packers and he got 29 cents. Another neighbor that I have a little influence over, put up his own apples and shipped them through on the same boat to England and he got $1.10. (Laughter.) A shipper in our own vicinity was telling me the other night that he sent west and bought a lot of apples and he sent his own packers up there to pack them and he bought a lot of apples packed by farmers in our section and the men who examined them in Montreal rejected those put up by his own packers and took those the farmer packed and sent them on. (Laughter and applause.)

Mr. M. PETTIT, Winona: I cannot agree with Mr. Boulter that the fault lies with the packer. Dozens of barrels of the choicest apples have this year been packed in the most careful and systematic way and sent to the old country that have scarcely paid expenses. I believe the fault lies in the way they are stored on ship or at the other end. I don't believe the grower is to blame for poor prices that are very frequently got over there.

## ADDRESS BY THE DOMINION MINISTER OF AGRICULTURE.

Hon. Mr. FISHER, who was received with applause, said: I am a farmer, it is true, and I grow some fruit for my own use, but I can't pretend for a moment to compare with those whom I am addressing in regard to the knowledge of fruit growing either in the growing of it or in the packing or marketing of it. Therefore it is rather hard for me to get up and undertake to say anything to this audience. However I have the courage which is inspired in me from the fact that I have not come here in any sense to teach you anything, but to try and learn something from you.

In my position as Dominion Minister of Agriculture, the onus has been thrown upon me to provide something in the nature of cold storage which is going to facilitate the export and the carriage of our perishable fruit products from Canada to the English market, and it is of the utmost importance to me that I should get all the information I can in regard to the trade in those products. Apart from the pleasure of meeting the men who have made Ontario fruit what it is and have earned for it the reputation it has the world over, I have come here simply and solely to try and find how I could facilitate and aid your trade and your business. (Applause.) This fruit business is of a peculiar nature, I think a good deal different in many ways from the dairy products, and the sale of those in the home market, with which I am most familiar; and in regard to fruit I find some little difficulties which I wish to learn from you how to overcome The other day in Nova Scotia I attended a meeting of fruit growers of what is here known as the Annapolis Valley—a name which has been extended to apply to the whole region extending fifty or sixty miles from the Basin of Minas to the Anna-

polis Basin; but in Wolfville and Kentville we are taken to task for using the term "Annapolis Valley" by the people who live in that section, which should be known as the Cornwallis Valley. I find the same difficulties among the producers of fruit in the Annapolis Valley and the Cornwallis Valley that I find among you. I was asked to provide cold storage for them so that they might be able to place their apples especially in the English market to advantage. I asked them, as I am asking you, what I could best do to reach that end. The answer there was, in the first place, provide a warehouse in Halifax—the shipping point for the large proportion of their apples—where they could store them until the market was fit to ship to, and secondly, to provide cold storage accommodation on the vessels from Halifax to the English market. They seem to think, as my own information led me to think, that in England to-day there is a considerable amount of cold storage accommodation, perhaps sufficient for the purpose of our trading there. That is to say, that if our apples or other perishable products can reach the English shores in the proper condition there would be no great difficulty there in finding the accommodation to keep them and maintain them until such time as the market is ready to take them. The difficulties that now meet you and the Nova Scotia fruit growers are probably about the same. They find in the first place that the railroad trains from even their short distance from the sea rather hurt the fruit. In a hot autumn day the fruit is heated, and they find again that in the ships as they go across the Atlantic at the present time the fruit heats, and it is not an unfrequent thing for them to find that when the hold if opened where there are a large number of apples the steam will rush up just as though the whole place below was full of steam. This is a thing which I think shows one of two things. My impression is that the fruit down there is too quickly put into the barrels. I am told that it is there a practice to take the apples right off the trees and put them straight into the barrels and ship them of to the sea as quickly as possible, and it looks as though these same apples steamed and sweated and heated in the hold of the vessels, and created this heat which injured them. You gentlemen who are fruit growers can tell me if I am correct in that idea or not. Then again, with the cold storage provided for these apples the question arises whether in a tight barrel for a short time all the cold of the cold-storage chambers will penetrate into the centre of that barrel sufficiently completely to keep the apples in proper condition, if they are put into cold storage in the kind of package which they are in the habit of packing their products. I have been warned by those who have dealt with this matter down there that the probability is that for cold storage purposes a change will have to be made in the package, and that the tight flour barrel, or apple barrel of the present day will have to be supplanted by something of a more open character, and perhaps smaller inside so as to make sure that the cold atmosphere in which the fruit is placed will penetrate quickly and evenly to the whole of the fruit contained in the packages. Here in Ontario you have a much larger railroad journey to the sea whether you ship from the port of Montreal or the port of Quebec or from St. John or Halifax according to the season. It will therefore be necessary that you should have refrigerator cars in which to send fruit from here to the sea-board, and I might say that I propose and expect next season to be able to arrange for a complete system of refrigerator cars which would go over the whole lines of the country, carrying our perishable food products as may be required to the centres where they may be kept in cold storage. (Applause.) I can understand quite well that this is a pretty large undertaking, and if at any one period in our season there should have to be moved several hundred thousand barrels of apples, it would be practically impossible that they should all be moved immediately after they are packed to the great centres; and therefore I want to ask whether it would be wise or best, or whether it would be necessary in the interests of the trade, that you should have cold storage warehouses in the great fruit centres as well as in the great shipping centres—when I say shipping centres I mean the parts where the goods would be transferred from the railroads to the ships to be carried across the ocean. That is one of the questions upon which I want your opinion and your views—whether it will be necessary in the great fruit growing centres to have cold storage warehouses where the fruit can be kept until such time as it will be possible or advisable to ship to the shipping ports. Another point on which I wish your suggestions is as to what extent these cold storage warehouses

will be required in the fruit growing centres ; what would be the likely amount of fruit to be exported in cold storage, that is to say, what the demands of the fruit growers of Ontario will be upon the cold storage that it is proposed to create ; and next I want to ask you about what length of time and what period of the year will be the greatest demand for this cold storage on the part of the fruit growers of Ontario. I may say that in my proposed arrangements in regard to cold storage the dairy interests require a large quantity of space during the latter part of the summer and winter. Will that be the time during which you too will be asking for space ? During the early part of the summer they will require comparatively little cold storage, because it has been found by several years' experience that the time when the price of butter especially in England tempts our people to ship to England is about July and from that on. Our poultry at the same time will in a general way be exported towards the fall of the year or in the early winter. The egg trade will probably go through the whole of the year more or less. I can understand, of course, that your large trade in apples is the great export of Canada in fruit, and if you attempt to export peaches or any of the larger fruits or grapes all these must be necessarily in the fall of the year ; but I would like to ask you to give me some idea as to how long during the year after your fruit is ripe you will be able to extend this export so as not to require too great an accommodation at one time of the year and none at all at another. I ask you to give me your views as much as you can on this present occasion, or to send to me later on your information and knowledge. Something was said a few minutes ago with regard to the glut of fruit and the fact that the steamers did not care whether they had apples this fall or not. The fact is that the fruit conditions on the St. Lawrence this year were very peculiar. In the early part of the season you could have abundant space for all you wanted, but just about the end of the season there was a great out-rush of our products, and though the ship owners raised the price of fruit they still had the whole thing in their hands, the call for freight was so great. It has been years and years since that condition has existed before, and it will be years before it will happen again, because the high rates of freight will tempt a larger number of vessels than before to come to the St. Lawrence, and the result will be a lower rate of freight than existed in Montreal this year. It was a mere temporary condition of affairs and one not likely easily or equally again. A remark was made as to refrigerator cars in winter and the shipment of freight in winter in refrigerator cars. This brings me to a point on which also I wish information—whether you will want refrigerator cars and refrigerator accomomodation during the cold weather? The general impression has been that the refrigerator accommodation for our traffic would only be required during the short summer months, and that when the cold weather comes in, in the fall, they would be no longer needed. My own belief is that when cold storage is once adopted and the people begin to avail themselves of it and take advantage of it, it will be required even during the cold weather, because the uniformity and even temperature without danger of frosts as well as without danger of extreme heat will be wanted for those perishable products, and that after a few years, if not immediately, cold storage will be asked for even in the winter season. I regret extremely that in the course of the discussion there was not more information elicited, that there was not more of what almost was diversity of opinion, because then you know a good argument will arise and we will be able to find out the exact truth of the matter from different points of view. I want before sitting down to so express my extreme pleasure at being here to meet the fruit growers of Ontario. I find a number of gentlemen whom I have had the privilege of meeting before on various occasions. I am glad to meet them again, and I trust that in the course of this meeting we will have a very thorough discussion of these matters and an abundance of information given me. It is my first visit to Kingston or to this neighborhood. In my former experience I have been about a little in the different parts of the country, but my wanderings have not brought me to this city. I am sure that the occasion of this meeting is a very opportune one to me. It is especially interesting to me in my capacity as Minister of Agriculture, charged with the interests in which I pride myself I am interested, that industry which is my own industry and my own business. (Applause.) It is also an extreme source of gratification to me to meet with the men who are engaged in fruit growing in the Province of Ontario. I think without

flattery I may say that fruit and its kindred employments is one of those industries which is not only of the utmost importance to the country, but it is one which develops about the best qualities in the individuals who are interested and engaged in it. (Hear, hear, and applause.) Wherever I have gone and mixed with the people, wherever I have come into a neighborhood where fruit growing is largely engaged in, I found men and women of the highest culture, whose tastes are always in the direction of the highest aspirations and the highest ideals of cultured people, and for this reason if for no other I am extremely glad to meet the fruit growers of Ontario. We of the Province of Quebec look to you as having done much more and gone much further than we have in this industry, partly because of your better climate, and in some places the richer soil and suitable conditions—partly because, I am fain to think, you people of Ontario are energetic, active, intelligent, and that whatever you take hold of you seem to be able to succeed in, in the most marvellous way. I do not say this from any flattery: I say this because, as one coming from a neighboring Province, as one who is to-day not only belonging to that Province and presiding over the interests of agriculture in that Province, but who has charge of the interests of agriculture for the whole Dominion, I am glad indeed to meet with the people over the whole country who have not had opportunities of meeting with before, but whom during the time I occupy the position I at present have I hope to have many opportunities of meeting with and discussing their interests and my interests and obtaining that assistance by which only I shall be able to assist that industry and push on that industry in which we are all concerned. (Applause.)

The PRESIDENT: I am sure that we are very thankful to the Hon. the Minister of Agriculture for the practical address with which he has just favored us. He has brought out points that I hope will now enable us to take up this question and discuss it in a proper manner. He has given you the invitation to do so, and it will be your own fault if you do not lay before the Minister the wants of your calling at the present time. In addition to that I think that the matter is of such importance that this society will be justified in appointing a committee who shall go into the matter thoroughly and lay before the Hon. Minister the information which he has asked for in his address, and for that purpose I will now appoint a committee to be composed of the Secretary, Mr. Orr, Mr. Fisher, and Mr. A. H. Pettit, and will ask this committee to present in writing to the Hon. Mr. Fisher at the earliest possible moment a full and complete statement of the case which will give him all the information that is desired. I should be very pleased indeed to hear any gentleman now who could give any information that will be of interest or benefit to the Minister.

Prof. SAUNDERS: I wish to say a few words on this subject of cold storage of fruit, because I apprehend there will be many difficulties in carrying out this project successfully in all classes of fruit. There is no doubt in the minds of any that have paid any attention to the question of cold storage, that cold storage is one of the most important measures that can be adopted at this time for the preservation of those perishable fruit products of which we produce so largely in Canada, and it is well at the outset to look the difficulties well in the face so that we may provide against what otherwise might result in disappointment. Experience is always of great advantage in all these things, and the experience we have had in the preservation of Canadian fruits it might be well to bring under notice. The first experience we had was at the time of the Indian and Colonial exhibition, and as I had charge of the shipment of fruits at that time I am conversant with the particulars. Cold storage apartments were built up in one or two steamers then running from Montreal to London, and a large collection of fruits was brought together, largely by the help of the members of this Association—one of the finest collections of Canadian fruits that was ever made—and this was shipped to Montreal. There was no storage accommodation in the cars at that time, but it was placed at once in this storage refrigerator which is built on the plan of the Hanrahan cold storage refrigerator, that is, with ice overhead and a large apartment where the chilled air could flow, and circulation also was provided for in the interior. The object there was simply to preserve the fruit long enough to take it across the ocean and exhibit it at the large exhibition that was to be held at that time in the halls of the Royal Horticul-

tural Society. That experiment was eminently successful, and some five or six thousand plates of Canadian fruit were displayed to the amazement of the English people, carried there in a very good condition. The next experimental test made was at the time of the Chicago Exposition. There we had to face the difficulty of preserving these fruits for six months. A very excellent collection was got together through the liberality and energy of the Provincial Government by the agents they appointed. Mr. Pettit and others brought together a large collection of Ontario fruits. A large collection was also made in Nova Scotia and the Maritime Provinces, and another in Quebec. These were nearly all packed in light packages and shipped to Chicago rather late in the season when there was not much danger of injury from exposure to heat, and placed at once in a large cold storage building there. We supposed that everything was all right, but about mid-winter I wrote to the cold storage people and asked them to examine the packages of fruit and endeavor to ascertain what condition they were in. They replied that they were in bad condition when the packages were opened, although they had been preserved in a uniform temperature. A large number of specimens were wholly or partly decayed, and the people who had charge of the storage work recommended that we have all the packages opened and have them repacked, rejecting that which was unsound and packing up only sound specimens. They further told us at that time that it was a mistake to put the fruit in tight packages; that if barrels had a number of holes bored in them, or if the fruit had been put in packages made with slats, that they might have been preserved better. They also objected to the wrapping of fruits—I believe it was wrapped mostly in pieces of newspaper. You know that the fruit wrapped in tissue paper by the California people and shipped in cold storage is kept very well, and I apprehend that the shipping that was objected to by the cold storage people in Chicago was more on account of the character of the paper, and if the fruit had been wrapped in tissue paper, which is very porous, there would have been the same rejection. We adopted their suggestion and repacked the fruit, and some of it came out in excellent condition in the spring and a proportion, especially the earlier ripened fruits, were found to have very few good sound specimens when they were taken out. I think this difficulty arises from the fact that chemical changes are going on in the early ripening of the fruits at the time they are put in the cold storage chamber, and here is where difficulty is likely to arise in connection with the preserving of fruit. In the preserving of dairy products any deterioration in that, at least from butter, begins from the outside, and the ferments which arise in cheese are of that character which are easily controlled by the low temperature than the changes that occur in the ripening of apples and pears. There, when the change occurs the skin which is not easily permeated by the changes of temperature and this chemical change which is not very well understood, is accompanied by the evolution of heat, so that when the ripening period has arrived and changes begin in the apples we have a difficult state of things to control in cold storage; and my reasons for bringing this point before the Association is to urge upon them to endeavor to overcome this difficulty by having the fruit go into cold storage when it is firm and sufficiently unripe to be sure that these chemical changes have not already set in and considerably advanced. I think that these difficulties we had in connection with the Chicago Exposition arose from the fact that the changes were already occurring in those early ripening fruits before they were put into packages to put into cold storage, and these having started were not easily controlled by any temperature that could be brought to bear on them in a cold storage warehouse. It is well to look those difficulties in the face and endeavor to overcome them by proper action at the proper season. The Canadian climate no doubt is of great advantage to the Canadian people. We have in this section of the country a climate where apples and pears of the very highest quality can be produced, possessing flavor superior to the apples produced anywhere south of us, and which if we take the fullest advantage of and endeavor to get these to the consumer in the condition in which they leave the producer, if they can be so carried without deterioration, I am sure there is a great future for the fruit trade in Canada. In any remarks I have made I would not be understood as throwing any difficulties in the way of cold storage We should, I think, in all these cases endeavor to gain what we can from the

experience of the past and thus add to the probabilities of successful management and great continued success in a great enterprise like this.

Prof Craig: Since the Hon. Mr. Fisher spoke one of our largest shippers came into the room, and I would suggest that the name of Mr. E D. Smith be added to the committee. I think he could give a great deal of valuable information.

The President: I think so myself, and will add his name to the committee.

Prof Saunders: Mr. Craig has carried on some experiments, and I thought that perhaps he would follow me and give the Association the benefit of the experiments that he tried last year in cold storage in Montreal, which was just along that line.

The President: We should be very glad indeed to hear from you on that line.

Prof. Craig: I think that the results of those experiments have already been given to the society, and they have been put in possession through the means of our annual report and through my own remarks at the last meeting at Woodstock. They are practically in line with the remarks already given by Dr. Saunders and simply emphasise the fact that if we would be successful in the preservation of our perishable fruits we must begin to put them into cold storage before any distraction or breaking down of the actions which the ferments preceding the process of ripening begets. The process of ripening, the process of maturing, is in reality a process of decay, and although at the beginning we may not recognize it as such, it goes on gradually from step to step from the time the apples is green till the time it is in a perfect state of maturity, and later on when it is past that step and has begun to decay. So that it is absolutely necessary that we should recognize this fact and this principle, and in storing fruit put it in a storage before any actions consequent upon the beginnings of ferment commence. In this connection I might say that I was very glad to know the day before yesterday in passing through Detroit on my way to the meeting if the Michigan Horticultural Society that Canadian fruit growers had already begun to take advantage of the cold storage system not only in Canada but on the other side. In visiting the large cold storage house of Webb Bros. in Detroit I found several hundred barrels of Canadian Snows in storage that were later on to be placed on the Chicago market. When I got to Grand Rapids, at the meeting I found still further evidence of the enterprise of Canadians, and the Michigan fruit growers are awakening to the fact the Canadian apples are forcing themselves on the American markets by reason of their better quality; and this just brings us back to the statement made by Dr. Saunders that we have a climate here that produces not only the finest pears but the finest apples in the world.

The Secretary: I believe if we could take advantage of cold storage warehouses for our pears, for instance, that it would be a great thing for the fruit growers of Ontario. During the last season and a year ago also I stored Bartlett pears both in Montreal and Toronto in cold storage warehouses. At that time they were selling at very low prices indeed. During this season, as you all know, Bartlett pears were down to twenty five and thirty cents a basket, and there was nothing in them, and I took advantage of this warehouse, for I knew they would be kept at a low temperature, and I kept them for a month or six weeks until after the crop was harvested and the glut was stopped. Now you know there is no pear that will sell when you can get a Bartlett, and the price rose last year from seventy-five cents to one dollar a basket, so you will see it was a fine step in advance for me to take advantage of that opportunity of storing those pears. If the Canadian Bartlett could be kept almost indefinitely in cold storage warehouses it would find sale at all seasons of the year, and it would be the pear for dessert purposes. The same thing can be said with regard to our Canadian Snow apple—no other dessert apple would be wanted if we could keep that apple in perfect condition throughout the season. So I think there is a great argument in favor of the establishment of such institutions.

Mr. Pattison: I would like to ask Mr. Secretary if he stored any baskets. I understood the baskets did not answer very well in cold storage.

The Secretary: I stored in baskets. I think the cold storage men objected because the baskets took so much room.

Prof. CRAIG: The baskets are not suitable for cold storage. They would be stored in the same space but the cold storage warehouse cannot be made rat-proof, and while these might not eat a great deal they damage a great deal, and I think the box package is capable of being packed easier and more safely.

Mr. FISHER: Professor Craig, do you find that while you have been able to preserve the appearance of fruit by cold storage you can hold the flavor?

Prof. CRAIG: In the case of apples and pears I did not find that there was very much loss of flavor. Of course there is always in stored fruits a certain loss of this fine aroma that we detect and so well appreciate when the fruit is just at its prime condition. You know it is Grindon, that fine old writer on English fruit, who says "There is just one hour when the peach is in its best condition. That hour passed, 'tis afternoon." In the case of stored fruits, it is frequently afternoon, although we may not recognize it when we eat them; but if we compare them with the same fruits in their highest quality when they are just ripe from the tree we will recognise it. In the matter of stone fruits there is a greater loss of flavor than in the case of apples and pears, particularly in peaches. Peaches after being stored for five weeks have a fair appearance, and on being cut do not show much discoloration, yet on being eaten there was a distinct and very observable difference in the flavor. Stone fruits sometimes show signs of decay from the stone; the decomposition sets in from the middle and works outward, like some of our pears do when they are ripening naturally.

Mr. FISHER: How long did those pears keep their flavor?

Prof. CRAIG: I put them on the market December 15th, they had been in cold storage since the first week in September.

Mr. FISHER: Did you ever keep Bartletts twelve months?

Prof. CRAIG: No, but I think they can be if you could be absolutely sure of your temperature and sure you could hold it just at the degree you wanted it.

Mr. FISHER: I have held the Pomme Grise twelve months. It was just as bright at the end of the year as when we put it into cold storage, but it had no flavor at all.

Prof. CRAIG: I tasted peaches yesterday in Detroit in the warehouse. Of course that is not very unusual as we may have some Smock peaches in ordinary warehouses. These were Crawfords. Their flavor was somewhat off, but they were good in appearance, and I think they were ahead of California peaches at any time.

Mr. ORR: Would not there be a decided advantage in putting fruit into cold storage at the point of production? After being carried they would be more or less bruised.

Prof. SAUNDERS: If they could be carried in refrigerator cars it seems to me that would be as good as placing them in cold storage warehouses at the point of production. What you want to do is to keep the temperature low and to ensure that the condition of the fruit, whatever it may be at the time when it goes into cold storage, will not deteriorate. That is, if it is possible to keep it from any further fermentation that it will not deteriorate until it reaches the consumer.

The PRESIDENT: Have you any experience, Mr. Smith?

Mr. E. D. SMITH: No, but one of the most important things in this connection is, how long will the pears keep after being taken out?

Prof. CRAIG: It depends on their condition when put in. If they are put in before they have reached full maturity and kept at low enough temperature I anticipate—and my own experience leads me to say this—they won't keep a shorter time than they would originally in natural conditions; but if they have ripened up to a certain point and then are put into cold storage and held there, they go down very rapidly after being taken out. With regard to the district cold storage warehouses I do not know that I am competent to say anything, but I may just throw out a suggestion, that it seems to me it would be of great advantage to growers if they could put their fruit in the district cold

storage warehouses, and from that point distribute it to the points that give them the best market prices at the time when they wish to sell it.

Mr. ORR: I picked certain varieties of grapes and put them away in a basket and they were good till May. I sent them to customers and they put them away in the same way as I had, and they did not keep till January. That is my reason for asking the question.

Hon. Mr. FISHER: Is that due to the journey?

Mr. ORR: I think so; I think it is due to the shaking on the stem and the pressing in the package.

Mr. DALY: I have been experimenting a little for the last five years on a small scale with a small refrigerator, keeping early apples, and plums and pears, and I have kept early apples such as the Transparent, Astrachan and such varieties for about six weeks, but after they strike the air and are removed from the refrigerator they are gone in twenty four hours, and you must do away with them. I have found that, while they come out of the refrigerator perfectly sound apparently, the flavor is nearly or in some cases entirely gone. My experience with pears has been that they will not keep as long as an apple. The best apple that I have found to keep in storage is the Yellow Transparent, of the early varieties, but I think you must be cautious in handling your fruit after it comes out of the cold storage; it has got to be handled very quickly, because it will stand no air. After it has been in cold storage for any length of time the moment it strikes the warm air it will go down.

The PRESIDENT: This question arises at once: under what condition or how well matured should your fruit be when you put it in?

Mr. DALY: I have experimented in that case. I have picked it quite green and put them in quite green, and it made very little difference.

Prof. CRAIG: What temperature did you have?

Mr. DALY: Well, I don't know just on the rule of hand. I kept ice in it; I never let it get empty of ice for a moment.

Prof. CRAIG: But the ripening process had been going on all the time, the temperature was not low enough and the fruit was nearly ready to go down when you took it out of the storage.

Mr. DALY: Yes.

Mr. ROBERTSON: I had an opportunity of going through a cold storage under one of the arches of the Brooklyn bridge, the most perfect storage ever I was in. In the office they have the temperature of every room in the building, and I saw pears about the 1st of March in perfect order. Of course when they come out of the cold storage these men have two rooms and they just take a basket or two baskets every day or two. They spoil very rapidly after they come out of the cold storage. The fruit men take them out as they want them.

Mr. CASTON: In keeping apples in a pit I notice they will keep perfectly well as long as you do not open the pit, but just as soon as you expose them to the air they will go very quickly. We often lose sight of the fact that a great deal of the fruit is not picked at the right time. The fruit is like a man going up hill; you want to take the apple just before you come to the summit. If you take an apple too much on the green side, it is insipid, but there is just a certain point where it should be picked, before the ripening process is complete.

Mr. E. D. SMITH: Is not there a great difference in the methods of cold storage as to keeping the fruit after it comes out? Will an apple or any fruit keep in ice storage as well as one taken from a chemical cold storage warehouse?

Prof. CRAIG: I think you are quite right that it will not, but at the same time I do not think we have full information on that point. All storage authorities are now agreed upon the mechanical or chemical refrigeration; and that kind of mechanical refrigeration

which gives not the dry air but as dry air as is consistent with keeping fruit without shrinkage, is best. Every cold storage manager that I have talked with advocates the best kind of mechanical refrigerator, that which is called the direct expansion, and gives dry air which is frequently changed by a perfect system of circulation.

Mr. PATTISON: I would like to ask if it would not work differently having a system whereby fruits when taken out of the cold storage would be introduced into a room that while warmer than the cold storage room would be colder than the outside atmosphere, and there kept for some time, on the same principle as people recovering from illness are kept as convalescents for a period before they go into the full enjoyment of their health

Prof. CRAIG: I think Mr. Pattison has stated his case, and it does not need any further bolstering up on my part. Fruit growers have noticed that if they put unripe fruit into a cold atmosphere there is immediately condensation on the surface and a collection of moisture which induces decay on the part of the fruit; and when you bring it from the cold to a warm atmosphere the fruit being cold causes condensation, and if you can do it gradually so much the better so as to get rid of this condensation.

Mr. PETTIT: The Hon. Mr. Fisher put some questions that I thought he would like to hear discussed somewhat this afternoon. One was whether it would be desirable to build cold storage warehouses at the places of shipment? I think if the meeting would discuss them for a few minutes it would not be out of place. In my opinion the carrying of fruit to the Old Country, testing our ability to market there by shipping in cold storage, could be done without these buildings, by placing the fruit at once in refrigerator cars and shipping it from the neighborhood where it is grown.

Mr. CASTON: In regard to building these houses at the point of shipment, I think that should be left largely to private enterprise. If there is any cold storage it would require to be at the ports of shipment; that is if there is any delay to occur between the shipment and the loading on the steamer, or the grower decides to hold it for a better market. The great thing is in the passage across the Atlantic and on the train. If we can get cold storage in transportation I think the matter of cold storage in the country will be largely a matter of private enterprise and will regulate itself. It is while in transportation that the fruit gets damaged.

The PRESIDENT: It occurs to me that there should be cold storage at the points where the growing is done, so that the fruit may be held there and sent forward in refrigerator cars and then in refrigerator steamers at the proper time, just when the English market would justify it.

Hon. Mr. FISHER: How soon after the apples are picked would it be necessary to put them into the cold storage?

Prof. CRAIG: I should think they ought to go into cold storage almost immediately after coming from the orchard.

The SECRETARY: I should think it would depend very much upon the variety. If they were summer apples, such as the Astrachan and Duchess, it would, but with the winter apples there would not be any necessity of hurrying.

Mr. E. D. SMITH: I quite agree that there should be cold warehouses at the stations ultimately if it is found to be necessary. The growers would not think it worth while to expend money, and I do not think the Government would be justified in erecting warehouses until after one or two season's test. Then I think it would be essential to have warehouses at the various stations.

## CHAIRMAN'S ADDRESS.

By Principal Grant, Queen's University, Kingston.

I have been asked to take the chair this evening, and I do so with great pleasure, because I am not only interested in your objects, but have listened yesterday and to-day with great pleasure to your discussions. I listened with very great pleasure yesterday afternoon to Prof. Short's address, in which he pointed out, in a way that I think was new to some of us, the connection of gardening with the development of civilization. I really began to think after listening to him that he has touched a genuine point, because I remember when I was in Scotland for years there was no class of men that seemed to me to combine so fully the advantages of industry and culture as the gardeners of that country, and I was very much struck with the remark that was made to me once in Scotland, that the gardeners were the only class that did not furnish any contributions to the criminal class of the country. (Laughter and applause.) It seemed that every other profession had contributed, some more and some less, but that the gardeners were marked with a white stone in that respect; and that is what we might expect when we remember that we are told at the very outset of Revelation that man was made in God's image, and further that for the development of man he placed him in a garden to dress it and keep it, indicating surely that in this way man's character would be most fully and beautifully developed to all its rightful issues; and that surely is the great object that we should look up to in dealing with this or any other question. It is surely a higher aim than even the more economical consideration, for sometimes we have at these discussions remarks made that seem to indicate that the country is to be judged by the amount of money that its people make. Now we know that men are not merely human bees or ants or beavers, but that they are the children of God, and that they are to be developed to all the rightful issues and to the very highest point of culture. We therefore feel that it is an object worthy the consideration of the statesman and the patriot and the true man, and so we are all interested in the work of your association. It is pleasing, therefore, to see that both the Dominion and the Provincial Governments recognize this, and that we have distinguished representatives of both Governments present at your meeting. (Applause.) I rejoice much in this, because I think it is the right course for Governments to take. I am pleased to think from what we have seen and heard that we have in the Hon. Mr. Fisher and the Hon. Mr. Dryden the right men in the right places. (Applause.) I think it is only right to say, however, that I believe that Mr. Fisher's predecessor was also a most suitable man for the position. He was not a farmer, and some people used to think, therefore, that he was not a good man for the position of Minister of Agriculture. I quite differ from that opinion. I think it is no more necessary to have a farmer in that position than it is to have a banker as Minister of Finance. What you need first of all is a man of good sense, and I have met even some farmers that were not blessed with that quality. (Laughter.) In fact it might even be said that it is a somewhat rare quality. You need a man, above everything else, with the power of judging men, so that he may get right officials, and then with that large common sense which, when he has obtained the right officials, will know how to trust them, to give them as free a hand as possible, this being a very big country, and it being quite impossible for a Minister to watch a man travelling over thousands of miles. And a man is needed who will know how to occupy the golden mean between paternalism on the one hand and *laissez faire* on the other. Governments are not for the purpose of superceding private enterprise; in fact Governments may stimulate certain departments of private enterprise too much; but it is their duty to discern the real basal capacities and industries of a country and then to afford opportunities for continuous scientific experimentation along the line of those basal industries, because that is the great war in which modern society is engaged, and therefore more required by governments now-a-days than even the departments of the army and the navy—a war against ignorance, a war

against those ceaseless pests and enemies that pray not only on our industries but upon our health. I saw only to-day in a newspaper the statement that the minute insects in the United States afflict the fruit crop to the extent of some three millions of dollars a year; and so there is perpetual need of scientific experimentation to detect these and fight against them; and there can be no discharge in this war, for as soon as one enemy has been vanquished another is sure to crop up. That gets an illustration from what we had in connection with the Dairy School in whose hall we are now met. Before the School was established the cheese of this district was far inferior to the other districts of Canada; but one of the highest dairying authorities stated that the school had raised the price of cheese in this district about half a cent a pound. I made a calculation and found that that meant $10,000 or $12,000 in one year; and as the Dairy School is managed at a cost of about $3,000, even in the very lowest consideration of the case there is a return of three or four hundred per cent. But there are more students from other counties than from this county; more students from all over eastern Ontario. They have sent out over one hundred men educated in the industry every year, taught habits of cleanliness and order, and these carry with them into their several localities those habits and are a benefit to the country in various other ways. And now that the institution is taken over by the Hon. Mr. Dryden, he does not mean to let it stop where it is. He will tell you that he intends to introduce great improvements and extensions; because it is quite clear we need in conjunction with it a chemical and bacteriological laboratory, and there is no place where you can have such at so cheap a rate as when you are in the neighborhood of a university, where, instead of having to pay a professor $1,500 you can get a tutor for one-tenth of the amount. It is a case in which you see the advantage to our common country of us all working together. It is quite clear that not only does Canada now raise very little more than enough wheat for her own consumption, but that any country that has virgin soil can raise wheat—the Hindoo ryot, the Russian moujik, the exile on the Pampas of Argentina, can raise wheat and sell it cheaper than we can; but these men cannot make good cheese nor good butter, nor raise the higher quality of Fameuse apples nor of Bartlett pears. A country is not measured in its greatness by its wealth; that is surely a most contemptible standard to judge any country by. The wealthiest countries of antiquity contributed nothing to the greatness of humanity; but little Athens, little Judea, what have they done? They have been the schoolmasters of the race—the one to the brain, the other to the heart and soul. And so we look not merely at the amount of wealth, but at the kind of men that the country is to produce, and the kind of men are determined chiefly by the industries in which they engage. It is no wonder, therefore, that we are all interested in your work.

## ADDRESS BY HON. JOHN DRYDEN.

I am very glad to be permitted to meet the prominent fruit growers of this Province in convention assembled, and to bring you the greetings of the Government which I have the honor to represent here. I have not come to undertake to instruct the men whom I see before me in the proper methods for bringing about the superior production of fruit of any kind growing in this country. It would never do for me to undertake to teach experts in this business, men who have for many years been giving their time and thought to this particular question, but I am here rather, to use a scriptural phrase, to stir up their pure minds by way of remembrance; and if my presence here will add anything of inspiration or enthusiasm to their work I am sure I will be very glad indeed. I ask the members of this Association to remember that they represent one of the greatest and most important industries of this Province, an industry which, if you will allow me to say it, is just in its infancy. It has made considerable progress, as you men know, but I venture to say that few of us realize what is before this industry in this Province of Ontario. (Hear, hear). I ask you to remember also that whether this industry shall be developed along right lines depends very much upon the efforts which will be put forth by this Fruit Growers' Association, and the future success will depend very largely upon

the foundations which will be laid now. I ask you also to remember that the efforts which you are now putting forth do not touch merely the present, but must inevitably reach forward far into the future. I shall never forget a remark made by an old man reaching nearly seventy years who was rebuked for planting a new orchard and asked what he expected at his time of life to reap from it. His answer was, "Well, if those that come after me will take as much pleasure and satisfaction in partaking of the fruit of these trees as I do in planting them I will be well satisfied." (Applause.) So I think the members of this Association should be stimulated in their work when they remember it is not merely for the present, but reaches far into the future, and that the next generation will receive benefit and blessing because of the work which is being done now.

When we remember all these things, and that the eyes of all the people of this Province are upon this Association—the people who furnish the aid to help to carry on the work in which you are engaged—and think of all the possibilities of this great industry, it is no wonder that we see in connection with this Association new life, new energy, new enthusiasm and new enterprises being manifested year after year. I am very glad that it is so, because it is undoubtedly true that there is very great danger, in all these organizations which depend largely upon public aid, that individual effort will be dwarfed on account of having a guaranteed income: but I wish to point out that the public aid to these organizations is given rather in order that we may by doing so stimulate and encourage the efforts of individual members of the Association to do better, greater and higher things than could be possibly accomplished without this aid. All the people are interested in the aid which is given to these various organizations, and it is given by those who are its guardians because they believe that all the people are directly or indirectly interested in the particular industry represented. The Legislature gives these grants cheerfully and willingly because they believe that spending it in this way will bring a better revenue and a greater return to all the people. If this is not accomplished there is no defence for the grant, which should then be curtailed or withheld altogether. The grants in recent years have been increased because those who had the authority to give them believed that thereby they would increase the revenue and the annual income of the people as a whole, and because they have faith in the future of this industry.

I do not know whether any of us fully comprehend what is to take place twenty-five years hence in connection with the fruit industry of the Province of Ontario. Commence if you will in the western end of the Province, on the fertile and rich soils of the newer counties of Essex and the sister county Kent, where they are able to astonish us by the production of the finest peaches and grapes as well as other fruits; go up along the shores of Lake Huron and around Georgian Bay and examine the quality of the fruits in all those districts; come across the country inland, taking in the old Niagara peninsula, about which everybody knows, and then come on down through, past the city of Toronto and along the shores of Lake Ontario until you get away into this eastern country, you have a territory with natural conditions adapted to produce a finer quality of fruit than you can find on any other piece of territory on this American continent. (Hear, hear.) There is no doubt of it. We have it here stated by gentlemen who ought to know better than I know—and I know myself what are the possibilities of superior production—but, as to the enormous quantities, we have territory enough and can produce quality sufficient to supply millions of people with the very finest of fruits when we have learned to produce them. Some of you gentlemen know perfectly well how to produce them; but my difficulty is that we have all over the country thousands and thousands of people undertaking to do what you are doing and failing in the attempt simply because they do not know how. It is to reach these people that this organization is brought together (hear, hear); it is to carry the instruction and information that you gentlemen possess; it is to carry the average of our product to a higher plane, that we give all these grants. Applause.)

If I read correctly the report of your meeting, some gentlemen connected with this Association are ready to stop and say we do not want any more develop-

ment of the fruit industry; we are producing too much already. (Laughter). Producing too much already? I am afraid that I will scarcely be able to assent to that proposition. I ask the gentlemen who have that view to remember that the year 1896 in the first place was a very exceptional year. The like of it perhaps none of us remember. Perhaps we have never had in other years such an extraordinary production in all parts of Canada, or at least in this Province; we have had an extraordinary production in all the fruit districts apparently of this North American continent, and it does not matter seemingly what particular variety of fruit—apples or pears or anything else—it seems that all along the line we have had a very abundant production; but with all this production, if we had been supplied with proper facilities to handle it, you would have found very little difficulty and you would not have had to exclaim "too much" at all. (Hear, hear.) But I am willing to admit, if you will, that we are producing too much of that which is inferior. (Hear, hear.) This is a pet theory of mine and I am always pounding at it, and I intend to so long as I have any power to pound at anything. This country does produce too much inferior fruits to-day. Many of our orchards were planted long years ago, when very little attention was paid to the variety of fruit, and the fruit that grows upon those orchards is altogether out of date and out of place. Those orchards were filled up, many of them with soft and inferior apples that are not fit to ship across the ocean; yet the attempt is made to ship them. Unfortunately all of them have to be marketed at the same time, and what is more, they have to be consumed all within a short period and the result is that naturally when you undertake to do this you have at one season or another what you call a glut in the market; and the inferior stuff—I ask you to remember this—the inferior fruit always stands in the way of that which is superior. (Hear, hear.) Somehow or another you cannot push it aside and leave the other to take its place. There it is in your way all the time; and though you have that which is superior yet the price which you will get for it is affected because you have that which is inferior thrust upon the people at the same time. The same thing is true of our dairy products. What did I find years ago? How is it about butter? I found stacks of it, warehouses of it, car-loads of it, tub after tub, tier after tier, piled up, and when you asked the gentlemen, "What are you going to do?" he would reply, "What can we do with it? we can make nothing but waggon grease out of it." But yet it was butter, it was in the market, and it was standing in the way; and this always works in the reduction of price of that which is superior. So it may be, and I am willing to admit, that we are producing too much of that which is inferior, but we are not producing too much of that which is superior in this country. Did we not hear the Secretary of this Association reading the quotations? You and I have read them, and they sent across on the wires from the Old Land, "To much of that which is inferior; send us your superior apples, and there is plenty of room for those in the market, but we do not want any rubbish." And there it goes on from week to week, the same thing being stated; so then I say there is room for development of this industry along those lines, and as long as we are willing to undertake a better production we shall find room somewhere, because I believe in the theory of my good old Scotch friend who, when I suggested that the price of one of his animals was very high, and that he would not be able to sell it, replied "Aye, but it is a good one, and the man is born somewhere that is going to buy it!" (Laughter). So I believe that people are born somewhere that will consume that which is superior, but will refuse to take that which is inferior, though you offer it to them at a much less price. After all, will it not be the survival of the fittest? (Hear, hear). It is true that in this Canada of ours there are some portions of the country where you cannot satisfactorily produce fruit; there are other portions of it where we have admirable natural advantages for this purpose. Well, now, if I produce an inferior quality of plums I shall just have to stand out of the way for some of my friends up about Owen Sound or in that direction, and let them have the market. If I can only produce a quality of grape which is very inferior I shall be before long crowded out of the market, and I will have to quit it and produce something that I can produce to advantage. So many of the trees that are now declared useless will have to be dug up by the roots, as I am digging up some on my own farm that my

father took care of for many years. He did not know that they were useless when he was taking care of them, and he had to go over the orchard again and put in new grafts because he had been deceived in the sale of the trees, which were a different quality from what he had expected. I am digging them up by the roots, and propose that their place shall be taken by something superior such as you see on this table. That is what we shall have done all over this country, and then we shall find that our products will hold their place and occupy the front position wherever they are put upon the market.

I congratulate the fruit growers of this country and the members of this Association on the fact that we are coming to better days, because we find in recent years that the gentlemen who are placed in authority in the public positions in our country are beginning to understand that it is one of their duties and one of their ultimate functions to undertake to help those who are following industrial pursuits; and so we have listened to the discussion which you had here to-day and to the words of the Hon. Mr. Fisher when he addressed you, when he told you that he had undertaken to provide better transportation facilities, and that he has proposed that there shall be a better supervision over these perishable products en route to the best markets of the world. Now this is all needed —this assistance to the men who are thus producing these articles. It is certainly very discouraging to a man after he has spent a year's labor and skill and has produced a very fine article such as you see upon this table to find that it is destroyed on its way to market because of improper facilities being afforded. It is a very discouraging thing, and one that certainly ought not to exist if there is any way of providing a remedy. Unfortunately too many people in shipping their fruit have been simply providing freight for the railways and steamships; these have got all they ask out of it; but the poor fellows who have labored and toiled for the production of it have had nothing out of it yet; sometimes they have something to pay as a bonus to the steamships and railways that carried it for them. This is unfortunate. Sometimes it is their own mistakes. Perhaps they have not paid proper attention to the production in the first place. There are some of our farmers who belong, I am afraid, to that class who are not too much gifted with what you call common sense, who when you bring instruction right to their very doors and thrust it in upon them will refuse to take it, will refuse to believe there is anything in it. And there are portions of this country where it is absolutely necessary that those who produce the best fruit should pay attention to spraying their trees with the proper article and at the proper time; but they say, "Oh, my father never did this, why should I do this? this is a great deal of trouble and bother; if we can get the fruit without that I guess we will let it go!" And it is only when you hammer away, and give them line upon line and precept upon precept, and give them object lesson after object lesson that they will undertake this work. Now, it may be in some places where there has not been the proper return that they have not paid proper attention and there has not been proper handling and all that; but I venture to say that in a good many cases it has been because of improper handling by the employees of the various railway companies and steamship companies who handle those goods. (Hear, hear and applause.) And I would like to say in the presence of Hon. Mr. Fisher that I will not be satisfied unless he undertakes somehow to get at these people. I do not believe that the Allans, for instances, who control one of our prominent steamship lines, and I do not believe that the gentlemen who are controlling these railways corporations, really desire that their employees should undertake the destruction of our property; and yet that is what they do, like a man who takes a trunk off a train, as if he was determined to smash it if he could. Yet it is so, judging from what we have heard here this afternoon. I believe if the attention of those who control these railway and steamship companies were drawn to the matter they would insist upon their employees paying proper attention; and I will expect that the Hon. Mr. Fisher in dealing with these men will draw their attention to the fact that this property is really destroyed because it is put in an improper position and in an improper place in the ship in the first place, and because when it is dumped out with such force it is all smashed to pieces.

I want to reiterate what I suggested in my remarks before this Association a year ago. I think it is high time that we should undertake to teach the fruit growers themselves—and

I am saying this, knowing that there are some gentlemen within sound of my voice who will not perhaps agree with me—that it is their business to act independently from start to finish in the choice of their trees, independent in the planting and caring of them, and in the picking and packing of their fruit. Let these men be taught how it ought to be done. Let your system be of such a character that the work well done will be at a premium ; let it be of such a character that the men who undertakes to deceive, who undertakes to fraudently pack his fruit and palm it off for what it is not, that suspicion will always rest upon him, and that it will be impossible without a good reputation in this regard that proper returns should be received by any of those men. I am as confident as that I am speaking to you just now that this is the correct principle. What do we find in many of our districts? We find farmers depending utterly and entirely on the dealers to pack their fruit ; and what happens in the season when the dealers are anxious to buy? They buy a great deal more ordinarily than what they can properly handle within the time limited, and so it comes to pass that the fruit is picked, laid on the ground under the trees, the chickens run over it, the birds pick it, the rain comes, sometimes the snow, and covers it over, and still the packers are not there to put it away. What can you expect under the circumstances? I think that ought not to be, and I think that we should encourage those who grow the fruit to pack it, and if necessary do as Mr. Boulter does, put his name on it. If I packed fruit I should not be ashamed to say that I packed it ; and if I did not do it correctly I ought to be told, and understand that I am going to suffer loss when I did not do it well. What I want is a premium on the work that s well done in this regard.

Then another thing: if there is one thing more than another we need in this country it is discrimination in the purchase of agricultural produce. What I mean by that is, let the quality tell the price. I remember perfectly well in my young days, when sent by my father to the market, when wheat was taken just at the same price, it did not make any difference what kind of wheat or how many times it had been run through the fanning mill. I remember when the great demand was made for barley in the early days that some men took barley from the thrasher without running through the mill at all ; and when I insisted upon mine being cleaned the men said, Mr. So and So takes his just from the thrasher, he never looks at the bags. All that has been changed ; and if you will undertake to obtain the first price you have got to have the first grade. That is good sound doctrine. I believe in it ; and sometimes you and I as farmers fail to produce the first grade and we feel aggrieved by it; but we cannot complain if we get the price according to the grade we submit to the buyer. It is just the same in regard to our live stock products. Some of us know that a particular class of animal on the English market will bring considerably more per pound than another class, and when the drover comes around and asks what we want he says, "I cannot afford to pay you any more than I pay Mr. Jones, because he will be offended." "But won't you acknowledge that this animal is worth more than the other—that this animal will bring almost twice per pound than the other will?" "Yes, but I have to take them on the average, and I have to make up on one what I lose on the other." I would like to ask if that is fair to the producer? I would like to ask if you are going to encourage superior production? You are really encouraging inferior production ; and we want to have men in this country independent enough to discriminate, and let us give a premium for that which is best. If we are to have any real progress, any really development in this industry, you must consent to put a premium upon quality. Some of you may remember that not very long ago, in speaking to another Association, I related an incident which occurred in the North-West, when the British Farm delegates were paying a visit to this country. One of them, a Welshman, whom I learned to know very well, gave me this himself. He was taking his dinner at one of the hotels in our North-West country, and he naturally asked for a piece of beefsteak. The poor man, as he told me, labored with this beefsteak and labored with it ; he tried his knife on both sides, lest he had got the wrong side the first time ; he took the piece of steak at all corners and all angles ; he turned it over on the other side and tried it again, and utterly failed to get a piece off at all or to make any impression upon it. (Laughter.) In the dilemma he beckoned for the waiter. "I

would like to ask you whether you people in this western country grade your beef the same as you grade your wheat?" The waiter said, "Beg your pardon; I do not know what you mean." "Why, I mean just what I say. I want to know if you grade your beef in this country the same as you grade your wheat; because if you do I should grade this beef that you have brought me as Number One Hard." (Laughter.) Well, number one hard beef is not wanted anywhere; it will not sell anywhere. I would like to know how much beef the worthy chairman would take at a hotel if he had any experience of that kind. As he says, that is the kind of beef that lasts a very long time, and if the landlord can palm it off on those who visit his hotel it is all very well, but the ordinary man will not put up with that sort of thing. But I want to say that number one hard apples, such as we can grow in this Province of Ontario, will find their way, if you will give them a chance, into the place where you will find the very best markets. The best markets in the world demand quality. There are people in Great Britain and New York State who have got sufficient income to say, "Give me the best you have got; I don't mind the price, but I want the best," (hear, hear); and when he knows where he is to get the best he will have the means to find it. I was very glad, indeed, to hear Prof. Craig saying that the people of the United States had begun to realize that the little Province of Ontario—a frozen bleak region in Canada that some of those people talk so much about—was producing fruit that excelled in quality that which they pro- themselves; and they will begin to study what kind of a wall they can put up to keep us out; but may I suggest, Mr. Chairman, that the wall won't keep it out if it is better? (hear, hear). We want more of that which is best and less of that which is worst. Let us keep this before us all the time, and you cannot keep the people from buying it. What we want in England is a better reputation. We have got a reputation for our cheese, and if I am permitted to do anything I am going to try and see if we cannot hold this reputation, for people are trying to get it away from us, and trying to get ahead of us. We have no reputation as yet for our butter, and we have no reputation in England for apples as we ought to have, because you load up the market with that which is inferior and which never ought to go. What we want is a system that will give a premium on quality, and that will help the man who produces to realize that only in this way will he find the best returns.

I believe that this country received one of the best advertisements that we could receive anywhere in the work that we did at the World's Fair at Chicago. (Hear, hear). The Province of Ontario spent a lot of money on that occasion, and there is no industry that has received greater benefit from what they spent there than the fruit industry. We exhibited our fruit in competition with the best fruit-growing States of the American Union, and the judgment of those who compared those fruits week after week and month after month was that ours was superior. But it is not enough thus to present it on the table. What we want to do is to see that we have a marketable commodity of that quality, and to show the people of Great Britain that we have any quantity of that same quality, and we want to keep it before them, and then there will be no doubt about the market we will have. Now what I am pleading for especially is that in all this I want the producer to get the benefit when he produces a quality that the market demands. There are some dealers here, and they will excuse me if I say I am not particularly interested in their welfare at all; they are perfectly able to look after themselves (laughter); but I do plead, and I am always pleading for the producer. That is the man after all who is really creating the wealth of this country, and he is the man who ought to receive the assistance now. I believe the man who has labored and toiled in the fields of our country is really adding to the wealth of our country, and the man who goes into the mine and into the forest—those are the people alone who are really making the additional wealth which our country has, and therefore these men ought to be aided and protected. The man who is bearing the burden and heat of the day and patiently receiving what Providence gives him, whether it is of storm or calm or heat or cold; who, when he has success is grateful and rejoices in it, but who, when he fails, pluckily tries it again, always going on with his work hoping for something better

in the future—these men who are at the very foundation of our prosperity, are the men who deserve our sympathy and who need and ought to receive our help. It is one of the legitimate functions of this Association to bring help to these men under these circumstances. There is a cry all over country for information for these men. Let the information be given freely and cheerfully and heartily, and even let it be given where it is not asked for, because the more information you can give and the more light you throw on this question, the less of that which is inferior will be presented on the market in competition with that which is superior, and so in that way we shall bring the greatest benefit to the greatest number of people in our country. I am aware that this work is very responsible and that the officers controlling this Association, if they rightly view it, will feel the responsibility which rests upon them; but is it not full of interest and encouragement and hope as well? The Government which I represent bids you God speed in this work. The country on the whole cheerfully pays the money that is required to aid you in this work; and I am sure there is no man listening to my voice, who has had to do with this work during these long years, who can look back and realize that they have had a hand in bringing about this development, without a feeling of intense pleasure and satisfaction. I congratulate you on the success which has resulted from your labors, and trust that this success will be in the future beyond even what it has been in the past. (Applause.)

## ADDRESS BY HON. SYDNEY FISHER, MINISTER OF AGRICULTURE FOR THE DOMINION.

Hon. Mr. Fisher said he had not come expecting to speak this evening. He expressed great gratification at seeing such a large meeting, and said he felt it his duty to meet the people whose interests he was set to serve, so that he might the better perform his official duties in relation to them. He proceeded: You said, Mr. Chairman, a few minutes ago, something in regard to the position of Minister of Agriculture, and you implied that while it was not essential that the Minister of Agriculture should be a farmer, I do not think you undertook, at all events, to say that he should not be a farmer—(Hear, hear and laughter)—and I confess that I do not agree with you in your expressions that he should be anything but a farmer. (Hear, hear.) I confess, sir, that if to-day I am the Minister of Agriculture of the Dominion of Canada, it is because I am a farmer, because the chieftain and the leader of the Government of the day thought that it was due to the great farming interests of this country that one who had studied that business practically should have charge of those interests. (Hear, hear.) But taking a little broader view, after all, you would not suggest that anyone but a lawyer should be the Minister of Justice. (Hear, hear.) You would not suggest that anybody, perhaps, but a merchant, or somebody who has engaged in and understands trade, should be the Minister of Commerce or the Controller of Customs; and therefore I think it is but right that the Minister who is in charge of the great agricultural interests in this country should be one who is engaged in that business, and has, therefore, a better opportunity of understanding its wants. (Hear, hear and applause.) But in this respect I can take you a little nearer to your own home, because you have had the example and the experience in the great Province of Ontario of a practical Minister of Agriculture who is himself a farmer, and who has proved conclusively, I believe, to the whole people of this Province, and I believe to the people in the other parts of the Dominion, that a Minister of Agriculture ought to be a farmer, and that a farmer makes the best Minister of Agriculture possible. (Applause.)

Now, I have been asked to say a few words about cold storage, a subject to which the minds of the people of this country are looking largely for improvement and benefit to the great business of our food production in Canada, and I may not arrogate too much when I say that to-day the hope of our whole country is in the improved conditions by which the food of this country can be sent to those great markets in the European lands that wish that food and are willing to pay the price for it. To-day the exports from Canada of food products are the largest of any one export from our country.

If we can in any way bring about the fact that those products shall have a slightly better price in the home markets of England and the Empire, we will bring more money into the coffers of the great producing classes of this country, and in that way enrich every class of the community. This end may be brought about by arrangement of cold storage, by improvements in transport and in methods of handling our products. To-day those food products, even though placed in the English market at the low prices that they make there, are the dependence of our people; and any addition which we can make to those prices will be almost entirely and wholly an additional profit. From enquiries I have made, and from what I can find in regard to the matter, the actual cost of the cold storage arrangements which may be necessary to place our products in the English markets in good condition is very, very slight indeed, and that the additional charge on the transportation of our food produce would be so small as to be hardly measurable to each individual pound or package of freight or butter or cheese. The improvement will redound almost entirely to the profit of the producers of this country. I congratulate this Association on the noble work it has done, and I consider that to this and kindred associations, aided so generously by the Ontario Government, through grants and institutes and the work of trained specialists, is due the proud position Ontario occupies in the agriculture of this continent and the whole world. (Applause.) No better educational work has ever been done by the Government than has been done in the last few years by the Government of the Province of Ontario. But while that is in the sphere of the local authorities, there is a sphere and there is a way in which the Dominion authorities also can aid in the work of the development of our country, and I hope that in the future more than ever, the Dominion authorities and the local authorities can work hand in hand, so that the sphere of the one will not overlap and interfere with that of the other. It seems to me that it would be folly that what Mr. Dryden and his government have been and are doing so well should be attempted by the government at Ottawa or by myself. It seems to me that outside of the proper sphere of the local governments there is an abundance of scope and of work which the Dominion Government can do; and I can assure you that the present government is entirely desirous of doing that work to the utmost extent possible—(applause)—and that in my position as Minister of Agriculture I shall devote my whole time and attention to the furtherance of that work. This work, it seems to me, is especially that connected with the trade and the commerce, which under our constitution come naturally and properly within the sphere of the Dominion powers, and it is right and proper that the Dominion should try to assist in the commercial aspect of the questions of fruit growing, dairying, live stock and grain export. Two or three questions naturally come up. One in regard to freight rates has been spoken of. It is one that is especially in the sphere of the Dominion Government, and I can assure you that in the future this question will be dealt with as it should be, with the interests of the agriculturist and producer thoroughly and well considered. (Hear, hear.) There is another part of it, and that is connected with cold storage. I regret to say that in some instances people have got very, very large ideas in regard to this. I have had schemes put before me in regard to cold storage that would involve millions and millions of dollars. I have been asked to subvent and subsidize schemes which would involve such large sums as would handicap the government in its other work. It should be remembered that governments are not made to do the work of the people altogether; governments are made to do the work of governing the country, but it is the people themselves who should undertake to do the especial work of the country, and who should themselves undertake the responsibilities especially of trade and commerce. Competition is necessary, and when the government meddles more than is absolutely necessary I believe that it does harm rather than good. (Applause.) The fact that England stands to day at the head, commercially, of the whole world is not due to anything her government has ever done; it is due to the enterprise of her citizens, and it is because they have been willing and able to go out into the whole world and fight their battles on their own merits and in the self-confidence of their own strength and their own vigor. I believe the same is true of Canada. I believe that we have to day in Canada a population that are well able to manage their own affairs, well able to conduct

their own business ; and I think that the government should do as little as they can possibly do with to interfere with that business. But I fully appreciate and understand that there are experimental suggestions of certain new things in which it is proper and right that the property at large should bear the burden of the experiment, and that no private individual should be asked to run the risk of that experiment—(hear, hear)—and to that extent and in this way I feel it my duty as a minister of the Crown, as a minister and a servant of the people of the country, to try and do that for them which they cannot be fairly asked individually to do for themselves. I am satisfied, however, that to accomplish this work of cold storage so that it will be a permanent success it is necessary that it should not be overburdened by too large an expenditure of money. If we were to go to work and establish enormous warehouses all over the country, and have every steamship that went out of Canada fitted with cold storage compartments, and if at the end of next season it was found that those warehouses had not been utilized, and that many of those ships had gone away with only a half or a quarter of their cold storage accommodation utilized, the result would be to throw discredit on the whole scheme, and the freight would be burdened with the enormous expenditure, the profits of which would have to be borne by the trade. I want to see that at the end of next season the people of this country will be so appreciative of the cold storage which may be supplied, and so satisfied of its success, that they will call for more instead of saying that we have had too much. I am satisfied that this is the way in which we ought to act, and this is the line which I ought to keep before me all the time ; and I am sure that the true interests of the trade would be much better and more largely supplied in that way than they would be to launch out extravagantly and largely at the first inception, and then find that we had made a mistake and gone too far. For what has been said in this convention at the meetings I attended of fruit growers of the Annapolis and Cornwallis Valleys, there is evidently some little doubt as to the way in which this cold storage can be best utilized or arranged for. Let us then proceed slowly and in an experimental way until we know exactly what we can do to the profit and advantage of the whole trade. When we have found that out by careful experiment, then let us launch out to the utmost extent that may be necessary in the interests of the trade of the whole country, and do it on a firm footing ; but if we go into it in the meantime and make a mistake of any kind we will throw more of a damper on the trade, so to speak, in the future. Before closing I wish to congratulate you on this splendid convention. The fruit growers of Ontario are more favorably situated judging from your success in exporting, than even many of the States to the south ; and as the quality of the Canadian product is on the average better than that of the more southern product, I do not see why you should not have a good market even in the American States for a good deal of your production, situated as you are so close to the enormous consuming centres in the American Republic. The Province of Ontairo probably will have to supply for a number of years to come the large bulk of the home market of Canada The great North West is opening up, and you ought to send fruit there provided the freight rates are such that you can. In Manitoba and North-West they cannot produce such fruit as you have, owing to climatic conditions, and till you get to the point where the British Columbia fruit would come eastward as yours was going westward you ought to have a large market. We cannot get that market there until we get the people into the country ; and the best way to develop the country is to show in the old lands that such things as these can be produced here—the delicate and the best productions of the earth—and that we have a people who show by their skill and intelligence that they can produce these things. I am a farmer, and whenever I address farmers I try to impress upon them that what they should do is to use their brains instead of their hands. It has been the general impression—and the farmers of the country have lent color to it—that any fool could be a farmer ; but in my experience of twenty five years on the farm and in going about the country I have learned by experience and observation that there is no business or profession in life in which a man who succeeds and does his duty by himself and his country requires such a high intellectual culture as a man who cultivates the soil and succeds in that cultivation. (Applause.) The young men who are rising up among us

and going to school and college, and who have to choose a career in life, need not for a moment turn aside from the cultivation of the soil, from farming and gardening, from dairying and fruit orcharding, because they are afraid that they will not in those careers find a large enough and good enough scope for their intellectual activity as well as for the exercise of their muscles and their hands. On the contrary, they will find as large a scope, if not larger, than they can in any of the other professions or walks of life. I trust these things are better understood, and as our young people are growing up and finding what they can do and how than can turn their best energies and intellects to these developments, we may find the brightest and best of our young people, boys and girls both, stay on the land, working on that land, and showing that in that work they can be the best of citizens and do the best for their common country.

Principal GRANT: I think that after hearing this impromptu address of the Hon. Mr. Fisher we will all be unanimous in the opinion that he is not only a farmer but that he is something else—(laughter)—and we rejoice that we have such farmers as he and Mr. Dryden; and depend upon it, as long as the country produces such as these we will be at no loss for getting Ministers of Agriculture. It was also a great pleasure to me to bear witness to the excellent work of his predecessor, and also with that official of his with whom we came most in contact here—Prof. Robertson—to whom we all have a very grateful feeling for the interest he has always taken in our work.

## ORGANIC EVOLUTION

Prof. KNIGHT then gave his lecture on "Organic Evolution," which does not appear here, as this report deals only with practical fruit-growing.

## REPORT OF SPECIAL COMMITTEE ON FINANCES.

Mr. E. D SMITH read the report of the Special Committee appointed to consider the financial position of the Association, as follows:

Your committee beg leave to report as follows:

1. We think the annual statement should show the assets and liabilities as well as the expenditure and receipts for the year.

2. That the auditors might look carefully into the figures presented each year not only as to their accuracy, but also to suggest any economies that they may think might be effected if any.

3. With regard to the item of $1,834 for printing *Horticulturist* for 1896, we find about $1,450 only was the cost of printing, or about three cents per copy, or $120 per edition of 4,000 copies of forty pages, the balance being for sundry items in connection with printing and distribution. We are unable to say whether $120 for printing each edition is excessive or not, but beg to suggest that tenders should be invited from a considerable number of printing establishments, including some country towns, with a view of getting the lowest price without, however, in any way impairing the quality or style of the publication.

4. We note that of late fewer chromo lithographs are used, which are expensive, and their place taken by photo-engravings, which are not only much more economical, but are more accurate representations, many of the lithographs being but exaggerated imitations of the natural fruit.

Lastly, we would suggest that whatever economies may be effected, if any, go towards enlarging and improving the *Horticulturist* complaints being made by members of affiliated societies that not enough space is given to amateur gardening and floriculture, and on the other hand practical growers cannot easily be induced, even by the prospect of getting a free plant, to part with their hard dollars in exchange for twelve numbers of the

paper, saying that they can get better value elsewhere. While we would not dare to say extensive improvements can be made with present receipts, we would respectfully suggest that a fruit journal equal to any in America ought to receive and we think would receive an enormously increased circulation, especially if accompanied, as the *Horticulturist* is, with a number of enticing side lines.

Mr. SMITH added that he would like to see a journal, if possible, with such a large scope that the members would be glad to pay a dollar for it. While the free plant distribution is not considered of very much value by many practical growers, yet without it it had been considered more difficult to get subscribers than at present.

The PRESIDENT stated that the Directors last night passed a resolution to take steps to reduce, if possible, the cost of the publication.

On motion of Mr. SCARFF, seconded by Mr. CASTON, the report was adopted.

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## REPORT ON FRUIT EXHIBIT.

Mr. RACE reported on the fruit exhibit and on motion of Mr. Huggard, seconded by Mr. Orr, the report was adopted as follows :

Having examined the fruit exhibit of the tables before us we have pleasure in reporting it one of the largest and finest in the history of the Association. Among the largest individual collections is one shown by Messrs. Stone & Wellington, consisting of about fifty varieties. Among the varieties worthy of special mention we find Wine Sap, Rubicon, Swazie Pomme Grise, Lawver, Sutton's Beauty, Boiken—thought to be a coming popular apple—Gano, and many other new sorts not yet in general cultivation.

A. E. Sherrington of Walkerton, shows a collection of only fair samples of several well known varieties

Mr. A. M. Smi of St. Catharines, shows a collection consisting of Champion Quince, D'Anjou, Jc hine, Lawrence and President Drouard pears ; also a red apple, seedling of the Ribst pippin, with flavor of parent, and a longer keeper, but not otherwise equal to it.

Mr. Dempsey, of Trenton, exhibits a collection of about fifty varieties of apples, among them a very fine sample of Ontario, Seek-no-Further, Ben Davis in several sizes and shapes, Stark, Newtown Pippin, Hubbardson's Non-such, Reinette, Grise—a favorite in France—two seedlings from the Spy and Russet, and another fine red fall apple without name. Mr. Dempsey also shows a seedling pear, a cross between Josephine and Duchess de Bordeaux, size medium, early winter and of extra fine quality. We recommend it strongly as worthy of propagation and general cultivation.

Mr. J. S. Scarff, of Woodstock, shows about twenty-five varieties of apples, the collection containing a very fine Blenheim Orange, Fallawater, Ontario and Spy.

Mr. Beall, of Lindsay, shows an Ontario and another variety without name resembling Ribston pippin somewhat, but without its flavor.

Mr. E. H. Wartman, of Kingston, shows a very superior Spy, Baldwin, Snow and Ben Davis.

Secretary Woolverton shows a collection of about sixteen varieties of apples, among them Princess Louise, King, Wagener, Spy, Cranberry pippin and Cooper's Market.

Mr. Harold Jones, of Maitland, shows the handsome Scarlet Pippin, Pewaukee, Alexander, Blue Pearmain, Yellowe Bllflower and Canada Red.

Mr. Huggard, of Whitby, exhibits a collection of twenty-six kinds, among them the Canada Red, Cayuga Redstreak, Duchess and several well known sorts. He also

shows an assortment of pears from his cold storage, consisting of about a dozen specimens.

Mr. R. W. Sheppard, of Montreal, shows a new seedling named Rochelle, an apple of medium size, good appearance, yellow splashed with red and of fair quality.

A seedling of the Fameuse family, good size, dark red in color, shown by Mr. Nichol, of Cataraqui, is an apple of very attractive appearance, but not up to the mark in quality.

A seedling known as Oliver's Seedling, shown by T. H. Race, of Mitchell, is an apple of large size, nicely splashed with red, looks like a good keeper and good shipper, and is of good quality as a cooking apple. Mr. Race also shows an apple supposed to be Plum's Cider; another, the Walbridge; and another, the Bottle Greening.

Mr W. S Turner, of Cornwall, shows a fine collection of about fifteen varieties, among them the Gideon, La Rue, a very superior McIntosh red, Wealthy, Wolf River, Red Beitigheimer, Talman Sweet, Princess Louise, a new variety called Stone, and several other well-known sorts.

Special claims are made for the following: 1. Wismer's dessert, by Mr. J. H. Wismer, of Port Elgin. It is a fair size, yellow splashed with red, very fine texture and choice quality for a dessert apple. 2. The Scarlet Pippin shown by Mr. H. Jones, in our opinion a rival of the Snow as a handsome dessert apple, and promises to become a favorite. 3. A seedling shown by Mr. W. C. Reid, of Belleville, much resembling the Snow and, in some features, the McIntosh Red. It is an apple of considerable promise, as an attractive dessert apple.

Extra fine specimens of the Pewaukee are shown by Mr. A. W. Peart, of Freeman.

Mr. M. Pettit, of Winona, shows a fine collection of grapes, among them the Cantawba, Salem and Herbert.

Mr. W. M. Orr also shows a very choice lot of Vergennes.

T. H. Race,
H. L Hutt,
E. Morris.

## REPORT OF COMMITTEE ON NEW FRUITS AND SEEDLING APPLES.

Prof. Craig read the following report on behalf of the Committee:

I am pleased to report an increased interest on the part of owners of seedling apples in bringing these apples to public notice for the purpose of ascertaining their particular features of usefulness with a view of introducing them if thought sufficiently valuable. In continuation of the work begun two years ago, a considerable number of varieties have been received and examined this year; where thought worthy they were described in detail and scions were asked for. In most instances growers have furnished these without hesitation, always being assured that their distribution would, until permission was given by the grower, be restricted to the various experimental stations.

In this connection I may be allowed to urge upon persons sending these seedling fruits, the necessity of wrapping each specimen in paper and enclosing them in a strong cardboard box, together with a history and description of the tree, the name of the sender and that of the owner or introducer. A number of packages have been received without anything but the post mark to identify them by, and sometimes minus that. This leads to confusion and enhances the labor of recording the necessary data. Suitable mailing boxes will be furnished by the Horticultural Division, Central Experimental Farm, Ottawa, on application, to those who wish to forward samples of seedling or other fruits for examination. It is also desirable to send six specimens in each case, so that they may be distributed to the three members of the Committee on New Fruits. Infor-

mation regarding the fruits received is given in condensed form in the following tabular statement. Where thought worthy a fuller description is appended :

SEEDLING APPLES.

| Sender. | | Remarks |
|---|---|---|
| Province. | Name. | |
| *Prince Edward Island.. | Gill, John H., Little York... | Medium to large ; yellow ; flesh juicy, with peculiar quince flavor. |
| Prince Edward Island.. | Ward, W. M., Uptown ..... | Three distinct seedlings ; not valuable. |
| Nova Scotia, C. B ..... | Paint, Miss M., Port Hawkesbury ..... | Crab ; not equal to others in cultivation. |
| New Brunswick ..... | Williams, B., Long Reach.... | Medium size ; round ; yellow ; winter |
| *Quebec..... .... | Dart, Rev. W. J.,St. Lambert. | Northern Spy seedling ; much resembles parent in appearance and quality ; winter, |
| Quebec..... | Frazer, John, Coaticooke .... | Small size ; round ; red ; winter. |
| *Quebec ..... | Herrick, J. E. K., Abbotsford. | "Herrick" ; good for cooking only ; keeps well ; mid-winter. |
| *Quebec..... | Herrick, J. E. K., Abbotsford. | "Bangle" ; medium size ; handsome ; fair quality ; early winter. |
| Quebec ..... | La Trappe, Oka ..... ..... | No. 1 ; medium size ; poor quality. |
| Quebec..... ..... | La Trappe, Oka ..... .... | No. 2 ; small ; crimson ; winter. |
| Quebec..... | La Trappe, Oka ..... . | No. 3 ; small ; yellow ; long keeper ; cooking. |
| *Ontario .. ..... | Allan, A. McD., Goderich ... | "Williams" ; small ; compact ; acid, juicy ; late winter. |
| *Ontario ..... | Burgess, Amos, Bala... . .. | Crab ; good size ; handsome ; September. |
| *Ontario ..... | Clare, R. P , Rideau Centre.. | Medium size ; yellow ; firm ; good ; winter. |
| Ontario ..... ..... | Fisher, M. J., Maxville..... | "Sir Oliver" ; red ; juicy ; fair ; resembles "Gravenstein" in appearance and season ; medium size. |
| Ontario ..... | Graham, J. J., Vandeleur ... | Medium to large ; green ; firm ; acid ; winter. |
| Ontario ..... ..... | Graham, J. J., Vandeleur.... | Medium size ; red ; poor quality ; autumn. |
| Ontario ..... | Greenfield, S., Ottawa East.. | Large ; red ; poor quality. |
| Ontario ..... | Greenfield, S., Ottawa East .. | No. 2 ; small ; yellow ; good winter. |
| *Ontario ..... ..... | Greenfield, S., Ottawa East .. | No. 4 ; medium ; yellow ; good winter. |
| Ontario ..... | Greenfield, S., Ottawa East .. | Medium ; yellow ; poor quality ; winter. |
| Ontario .. ..... | Herriman, Dr. W. L..... | Autumn ; quality medium to poor. |
| Ontario ... ..... | Kerr, W. J., Renfrew..... | "Knight's Russet" ; a small, sweet, white fleshed russet ; may be locally valuable ; autumn. |
| Ontario ..... ..... | Kerr, W. J. Renfrew ..... | "Knight's No. 1" ; resembles St. Lawrence ; two or three weeks later ; handsome ; fair quality ; autumn. |
| Ontario ..... | Kerr, W. J., Renfrew..... | "Fraser's No. 1" ; small ; poor quality ; autumn. |
| Ontario ..... | Kerr, W. J., Renfrew..... | Seedling ; Blue Pearmain type ; worthless. |
| Ontario . ..... | Kittermaster, A. R., Orillia.. | Medium size and quality ; early. |
| Ontario ..... | Leef, W. H., Orillia ..... | Large ; green ; poor quality. |
| Ontario . .... ..... | Lowery, E. D., St. Davids... | Small ; said to be a crab ; September. |
| *Ontario ..... | Morse, S. P., Milton..... | Medium to large ; yellow ; quality best ; promising ; probably a seedling of Early Harvest ; early summer. |
| *Ontario ..... | Morse, S. P., Milton ..... | Medium to large ; oblate ; red ; sweet ; late winter. |
| Ontario ..... | McConnell, H. L., Grovesend. | Medium size ; crimson ; good quality ; winter. |
| *Ontario ..... | Ramer, John H., Markham.. | Medium size ; yellow ; good quality ; not attractive ; good keeper. |
| Ontario ..... | Roberts, C. H., Paris ..... | "Ridgemount" ; medium size ; sweet ; summer ; not good enough to compete with "Duchess." |
| Ontario ..... ..... | Roberts, C. H., Paris ..... | "Allan Ridgemount" ; medium ; yellow ; fair ; mid-winter. |
| Ontario . .. ..... | | |
| *Ontario . .... ..... | Williamson, W. P., Port Nelson .... ..... | Small ; oblate ; yellow ; good ; mid-winter. |

PLUMS.

| | | |
|---|---|---|
| *Nova Scotia | McFarlane, D. H., Pictou | Seedling of White Magnum Bonum; good quality; season, late September. |
| Nova Scotia | McFarlane, D. H., Pictou | Seedling of White Magnum Bonum; blue; nearly free; fair quality. |
| Ontario | Ruth, S., Ridgetown | Blue; size of Lombard; cling; late August. |
| *Ontario | Smith, A. M., St. Catharines. | "Smith's October"; medium size; nearly black; cling; fair quality; October. |
| Ontario | Stephens, C. L., Orillia | Seedling; native red; good quality. |
| Manitoba | Bell, James, Minette | 9 samples Native Manitoba plum; Nos. 1 to 3 worthy of propegation in Manitoba. |

PEACHES.

| | | |
|---|---|---|
| *Ontario | Bruner, M. G., Olinda | "Corlett"; medium; pink; yellow; free, end of July. |
| Ontario | Whaley, M., Olinda | "Ermine"; medium; partially free; pit large; ripe first week in August. |

GOOSEBERRIES.

| | | |
|---|---|---|
| Ontario | Stephens, C. L., Orillia | Medium size; white; fair quality; July 10th. |

CURRANTS.

| | | |
|---|---|---|
| Ontario | Stephens, C. L., Orillia | Red Dutch type, but sweeter; July 10th. |

GRAPES.

| | | |
|---|---|---|
| Ontario | Gordon, J. K., Whitby | Large; black; juicy; acid; thin skin; late. |

APPLES.

*Seedling Apple.* From W. J. WILLIAMSON, Port Nelson, Ont., Jan. 20th, 1896.—Small, oblate, yellow ground nearly covered with crimson stripes and splashes. Cavity, deep and russetted. Stem, slender. Basin, shallow, eye open. Flesh, yellow, crisp, breaking, very juicy, pleasant. Size of this apple rather against it, otherwise, promising; worthy of further trial. Season, midwinter.

*Seedling No. 4, Greenfield.* March 4th, 1896.—Medium size, conical, yellow ground with light red striping. Flesh, yellow, firm, juicy, sprightly sub-acid, good, with Roxbury, Russet flavor. Large mellow core. A keeper. Worthy of further trial.

*Seedling Apple.* From J. H. RAMER, Markham, Ont., April 30th, 1896.—Above medium; roundish, oblate, tapering rapidly towards calyx. Skin, rough, golden yellow, russet dots, blushed with light red towards cavity. Cavity of medium size. Stem $\frac{1}{2}$ to $\frac{3}{4}$ inch long, smooth. Basin, small, almost wanting, calyx closed. Flesh, white, flaky, juicy, mild sub-acid. Quality good at this season, April 30. Fruit not very attractive, but regular in form, and otherwise desirable. Forwarded by Dr Beadle. Mr Ramer says:—"The tree was planted in 1823 and is now 73 years old. My father, Peter Ramer, planted nearly 300, all seedlings, on about five acres, and there were not two trees that bore apples alike—all different. I think he brought the seed from the States. They are

* A named English variety.

generally good keepers, and we usually have some until June. I have kept some odd ones until September. The tree has had a number of the limbs broken off by ice storms these last few years. The tree bears every year and is very full of buds again."

*Seedling Apple.* From S. P. Morse, Milton, Ont. August 14th, 1896.—Large, round regular, clear yellow skin, smooth, glossy, with more or less indistinct black dots. Cavity, broad, sloping rapidly. Stem, medium length. Basin, small, round, smooth, eye open. Flesh, white, tender, melting, buttery and juicy, with a peculiar pear-like flavor and aroma. Said to be a seedling of Early Harvest. Very fine, promising and worth propagating, if tree is vigorous. Mr. Morse says:—"I take it to be a chance seedling of the old Yellow Harvest, because the tree sprang up not far from one of that variety which it very much resembles in many points, but is more vigorous. The fruit is much larger, finer in texture, better form and exempt from fusicladium. It is here pronounced the 'best of all harvest apples.'"

*Seedling Apple.* From A. L. McConnell, Grovesend, Ont., Sept. 15, 1896.—Fruit medium, round, remarkably regular in form, entirely covered with crimson and thickly dotted with large whitish specks, very handsome. Cavity, almost wanting. Stem 1-16 to $\frac{1}{4}$ inch long. Calyx, open. Basin, small, shallow, only a slight depression. Flesh, white tinged with red near calyx, juicy, mild sub-acid, melting; quality good. Said by Mr. McConnell to be a keeper, but in good eating condition, September 22nd, 1896. Mr. McConnell says:—"Small and imperfect specimens of seedling grown by myself. The tree is a remarkably strong symmetrical grower, and an annual bearer. Fruit not subject to scab, very uniform in size and shape. The enclosed specimens are culls, the best having been used."

*Seedling Apple.* From F. P. Clare, Rideau Centre, Ont., Oct. 10th, 1896.—Medium to large, round, sloping to calyx. Skin, yellow, partly covered with a bright red blush. Cavity entirely wanting in some specimens. Stem, large, 1 inch long, very obtrusive; except for this the apple would be valuable. Calyx closed, set in a deep narrow basin. Flesh, white, firm, crisp, juicy, peculiarly melting, rather acid. Season, midwinter. Mr. Clare says:—"The seedling originated on the farm of a Mr. Pattie, between L'Orignal and Vankleek Hill, about sixty miles east of Ottawa, and is commonly known as the Joe Pattie apple. The tree is a fair bearer, bearing every year; a very thrifty grower, perfectly hardy, but its chief point of merit is its keeping qualities. In our cellar, it keeps perfectly until April or May, when apples are worth from $1.00 to $1.25 per bushel. So convinced am I of its worth, that I have been grafting from it for the past two springs. It and the Canada Red are the two best keeping apples that I have found for this climate."

*Seedling Apple No. 3.* From S. P. Morse, Milton, Ont., Oct. 29th, 1896.—Tree resembling Spy. Fruit slightly above medium, flat and oblate, conic towards eye, regular. Skin, smooth, green, well covered with dark red, suffused or in stripes, numerous small dots. Cavity, smooth, broad, sloping and deep. Stem, $\frac{3}{4}$ to 1 inch long, fairly stout. Basin small, shallow. Calyx, small, open or partly closed. Flesh, white crisp, juicy sweet, very pleasant and melting. Not ripe at this date. Core small. Seeds large, plump. Appears to be a valuable sweet winter apple. Mr. Morse says:—"Tree like the Spy finely fastigiate, very vigorous. It has no marked excess of those small spray-like twigs that infest the growth of the Spy and produce most of its worthless fruit. The crop is produced, mainly, on the wood of the last year's growth, and being large weighs down in weeping form the branches with its uniformly large bright copiae, an emblem of humility in the midst of luxury. Holds well to the tree."

*Seedling Apple.* From J. H. Gill, Little York, P.E.I., Nov. 11th, 1896.—Above medium, obling, slightly conic obscurely five-sided. Skin, green, glossy with pinkish blush on one side. Cavity broad, moderately deep. Stem $\frac{3}{4}$ to 1 inch long, stout, thickened at base, curved. Basin shallow, wrinkled. Calyx large, closed. Flesh white, juicy, but not melting, with a quince-like flavor, decidedly peculiar but pleasant. Core large open. Very nice. Worth propagation on account of its flavor and keeping properties. Prof. Jas. Fletcher says it reminds him of the Quince Pippin of England

*Apple Seedling, "Bangle."*—From J. E. K. Herrick, Abbotsford, Que., Nov. 16th, 1896.—Large or above medium, oblate, regular, smooth. Skin greenish yellow, mostly covered with light red stripings and blotchings. Cavity, broad and deep, sometimes russetted. Stem, slender, ½ to ¾ inch long. Basin, small, round. Calyx partly closed Flesh yellowish white with a distinct St. Lawrence flavor, rather mealy, slightly lacking in juice at this date; kept in a rather dry place; fair in January. A chance seedling which came up in the garden and was allowed to grow. Tree about 25 years of age, roundish top hardy; a heavy alternate bearer. Probably a seedling of St. Lawrence. Named after the owner of the farm. Worthy of further trial.

*Apple Seedling* (of Northern Spy). From Rev. W. J. Dart, St. Lambert, Que., Nov. 16th, 1896.—Medium or under, Northern Spy in shape, with the same ribbings more or less distinct. Color solid dark crimson Cavity broad and deep Stem, long, stout Basin small, shallow. Flesh yellow, firm crisp, almost identical with Northern Spy in flavor. Specimens received have been too much dried. They were also affected by skin spot. Season, midwinter. Tree about 15 years of age, hardy. Mr. Dart says:—"At our annual horticultural exhibition we had a plate of apples shown which seem worthy of notice. These apples were shown by Mr John Duckworth, G.T.R. Bridge Inspector. He says that ten or eleven years ago he planted some seeds from a Northern Spy apple. One of the trees, never grafted, has borne this year and the fruit is very like Northern Spy in color, shape, and is very firm and heavy. The tree is quite hardy here at St. Lambert, and has never been winter killed. The garden where it stands is about half a mile from the bank of the St. Lawrence and is rather sheltered. They look as if they would be good keepers and prove a valuable winter apple for the Province of Quebec."

*Williams Apple.* From A. McD. Allan, Goderich, Ont., Nov. 16th, 1896.—Small, roundish, conic; yellow skin with pinkish stripes on one side. Cavity, very shallow, Stem short, ⅜ to ½ inch, with prominent terminal knot. Basin shallow with slight ribbing. Flesh, yellowish white, firm, crisp, very juicy, acid and aromatic. Core small, open. Rather promising on account of compactness of form, and pleasant acidity of flesh. Should be valuable as a winter kitchen apple. Season, late winter.

### Crab Apples.

*Seedling Crab.* From J. P. Cockburn, Gravenhurst, Ont. Grown by Amos Burgess, Bala, Ont.—Medium size, round, regular, bright scarlet. Skin, smooth, shiny, red Siberian type. Stem long. Flesh crisp, juicy, firm, slightly astringent. Probably a good jelly variety. Season, end of August. Promising on account of beauty and fair quality.

### Peaches.

*Corlett Seedling.* From M. G. Bruner, Olinda, Ont., July 27th, 1896.—Size, 2 inches longitudinally, 2½ inches laterally; smooth and regular, nearly round. Suture, shallow extending half round. Stem set in a deep cavity. Skin greenish yellow when fully ripe, fairly well colored with a pink blush towards stem end. Flesh pale yellow without red markings, quite free, moderately firm, very juicy and sweet. Seems to be a promising early variety. Mr. Bruner says:—"I send sample of seedling peach for inspection. The producer says it is a free stone seedling, of good flavor, and grows evenly distributed on the tree. Please call it Corlett's seedling, which is the name of the producer. The trees grow much the same shape as the Amsden June."

### Plums.

*Smith's October.* From A. M. Smith, St. Catharines, Ont., Oct. 4th, 1896.—Medium size, 1⅜ inches each way, nearly black when fully ripe; slightly one-sided. Suture obscure; blue bloom, with some mottling. Flesh brownish yellow, clings to stone. Stone globular, with deep hollow alongside a very thick margin. Mr. Allan does not think that

other varieties of the same season are fully as valuable. He says:—"There are many seedlings in this section of this class, but owing to the fact that they are like this, under size, and not possessing any distinguishing points to recommend them specially, I have never brought them to notice. Besides being late, they seem to be past the time when a demand exists generally for the plum. Coe is as late as I have found value for a plum, and I would be inclined to pass anything late unless it was large and a good cooking plum with free stone, if possible. There might be some money in such an one. It is undoubtedly a good cooker."

*Plum.* Seedling of White Magnum Bonum. From D. H. McFarlane, Pictou, N.S., Sept. 28th, 1896.—Medium to large, egg-shaped, tapering towards stem. Suture plainly marked, but not deep. Stem fairly stout, 1¼ inches long. Skin, greenish yellow with light lilac bloom. Flesh yellow, firm, good quality, closely adherent to stone. Stone, small, flat, one sided, hollow near wing. Somewhat one sided. Season, last week of September or 1st of October; in best condition probably in the middle of September. Mr. McFarlane says the samples are undersized.

Mr. A. McD. Allan says:—"The plum, seedling of White Magnum Bonum (Yellow Egg,) strongly resembles Coe's in form, only smoother in skin The mottle, which is distinct, resembles Imperial Gage. The pit has a close similarity to the parent, quality good. With us it would scarcely have a place for introduction, owing to the fact that it is about the same season as Coe's and scarcely as large. But it may be valuable for other sections if the tree has hardiness to recommend it. Doubtless bearing quality will be all right, and flavor is good for cooking; the sprightly sub-acid tinge almost makes it desirable for eating, being distinctly a variance from the heavier flavor of Yellow Gage. It has also more juice and finer grain, Pity it is a cling."

## Supplementary Report.

The following supplementary pages were added by the Secretary:—

During the past season a good many new fruits have been brought under the notice of your Secretary, some of them scarcely worthy of notice, while others seem to give promise of considerable value. Among them are the following:—

### Apples.

*Morse's Harvest Apple.* Received on August 13th from S. P. Morse, of Milton, Ontario.—It is larger in size than the Early Harvest and is free from scab. It resembles the Early Harvest in color and form, except that it is somewhat conical. It is later by about two weeks. The quality is very good, the flesh, white, tender, juicy and and aromatic.

*Morse's Seedling No. 3.* Samples of this apple were received on October 30th, from S. P. Morse, of Milton. Size, above medium, oblate, slightly conical; color, yellowish green, striped and shaded with light and dark shades of pinkish red, with a greyish bloom, and numerous obscure light green dots. Stem broken, set in a narrow, deep cavity; calyx closed in a corrugated basin, with five crowns. Flesh, white, juicy, meaty, crisp; flavor, rich, agreeable, excellent. Concerning this apple, Mr. Morse writes:—"The specimen sent is a fair average; indeed there are no small fruits ever produced, all large and usually better colored than the sample which was gathered prematurely. The habit of the tree is fastigiate, like the Spy, equally vigorous, with fewer small spraylike twigs producing imperfectly developed fruit. Crop is borne chiefly on the last year's wood.

*Mountain Seedling.* Found growing by the Secretary on the side of the mountain on his farm at Grimsby.—It has several interesting peculiarities. 1st, a wonderfully heavy bloom, 2nd flesh deeply stained with red all the way through, 3rd, skin abnormally thick and tough

*Rochelle.* A sample of this apple came to hand from R. W. Shepherd, of Montreal on the 19th of November.—It somewhat resembles the Cranberry Pippin externally, except that it is more oblate, and has a peculiarly, large, deep and abrupt basin. Fruit, large, unequal, roundish oblate, somewhat uneven, obscurely ribbed; stem broken in sample, set in a narrow, deep cavity with prominent fleshy lip on one side; calyx open in a large, deep, abrupt, uneven basin; color, yellowish green, shaded and striped with light and dark shades of bright red.

*Scarlet Pippin.* This apple originated on the farm of Harold Jones, near Brockville, and belongs to the same family as the Snow, McIntosh and several others of our most valuable dessert apples. It has been described by Mr. Craig, and a section of the apple is given herewith. The description is omitted, because it has already been given by Mr. Craig.

### Peaches.

*Whaley's Favorite.* A seedling peach raised by Mark Whaley, of Olinda, Essex Co., Ontario.—Samples of this peach were sent in to the Secretary during the first week in August, and they are claimed by the originator to be in season about two weeks in advance of the Crawford. The peach is yellow in flesh, of attractive appearance, of fair size and almost a freestone. Apparently well worthy of testing.

### Pears.

*Sapiega.* Scions received from Jaroslav Niemetz, of Russia. Fruited by L. Woolverton, Grimsby: matured, August 13th. Size, medium, oblate, beautiful color, yellow with reddish fawn cheek; flesh, somewhat firm, juicy, agreeable, not equal to the Clapp's Favorite of the same season.

### Plums.

*Early Blue.* From A. M. Smith, St. Catharines.—Very early plum about the size of Lombard, but of much better quality. The samples were sent in about the 15th of July. Its earliness was its chief point of recommendation.

*Native Red.* From W. N. Snelling, of Ottawa. The plum has already been reported upon by Professor Craig. It is of fair size, bright red and very attractive.

### Small Fruits.

*Smith's Giant Black Cap.* This raspberry is a seedling raised by A. M. Smith, of St. Catharines.—On the 8th of July it was visited by the Secretary of the Ontario Fruit Growers' Association who reports that it was carrying a very large load of fruit. Mr. Smiths claims for it hardiness and productiveness, and Mr. G. C. Caston, who has tested it at Simcoe Fruit Experiment Station, reports that it is hardy at that place. In other respects it much resembles the Gregg.

## FRUIT GROWING IN THE MIDLAND DISTRICT.

### By Mr. James Daly.

Mr Daly prefaced his paper by remarking that by the Midland District he meant the vicinity immediately surrounding Kingston.

Fruit growing in the Midland District in the past has been a series of experiments, many of which have been disastrous failures on account of want of knowledge of what varieties were best adapted to our soil and climate; but enough have been successful to prove to us that most, if not all the fruits grown in this Province except

peaches can be grown here to great perfection. Twenty years ago the greater portion of fruit consumed in the city of Kingston was brought from Niagara district or the United States, but to-day we are independent of the western part of the Province or the States. As far as the growing of apples is concerned we stand at the head of the list of competitors for the last ten years at our own great exhibition, namely, Montreal Provincial, open to the world, and Central Canada exhibition at Ottawa, also open to the world. This being the fact should we not ask ourselves the question, what is to be done in this great industry in the future? Are we to stop contented with what we have accomplished, or shall we not persevere and develop the large resources within our reach? There is no part of the Province that has so much land as we have bordering on the River St. Lawrence and Lake Ontario which is particularly adapted to the growing of apples to great perfection; and although we have not a very large portion of country adapted to the growing of pears and grapes, still we have enough to supply our own market and some to spare. Cherries, plums and most of the small fruits can be grown in the Midland district to perfection, and when we consider the great demand for fruit and the increased consumption owing to the new markets opened up to us, we can easily see that this industry is but in its infancy, and if we carefully improve the advantage we enjoy fruit growing will become a source of income to this part of the Province.

The question of how best to accomplish this object, or how to make fruit growing pay is one that should deeply interest us all, but I do not consider myself competent to answer all of those questions. Still I may be able to offer a few suggestions that may be of some value in the future. I remarked in the beginning that many of us have had great failures caused by planting the wrong varieties, but now this need not occur again if we only become members of the Fruit-Growers' Association, and profit by their experience and observations, and remember not to plant too many varieties of fruit unless there is a demand in the market for them. I would strongly recommend growers in the future to plant only apples of a commercial character, that is to say, apples that can be shipped to both our local and foreign markets, and when those are planted they should be carefully looked after and fed in order to make them pay. The day is fast coming when nothing but first-class fruit will pay, and in order to accomplish this result we must give strict attention not only to planting and cultivating but also to the destruction of all insect pests and the prevention of fungous diseases which our fruits are subject to. In putting up fruit for market there has also to be a great change. I think we might very profitably take a lesson from our western neighbors in the Grimsby and Niagara districts. If it pays them to wrap carefully their fruit in paper and pack it in nice boxes, why would it not pay us? I feel assured it will not be long until our choice applies will be wrapped and sent in cold storage to the markets of Europe, and we all hail the happy day when fruit growers can send their fruits across the ocean at all seasons of the year. But I need not dwell upon this matter as the Fruit-Growers' Association has this project under consideration and I most sincerely regret that in the wise deliberations of your association in the past you have no seen fit to establish an experiment station in the Midland District, but I still cherish the hope that before bringing to a close the business of your session you may see your way clear to grant to us this small concession which would stimulate the business of fruit growing and become an everlasting boon to the residents of the Midland District.

The SECRETARY read a letter from Messrs. Hart and Tuckwell calling attention to an apple called the Longevity, also a letter from Mr. Shuttleworth, of Brantford, regretting his absence on account of illness.

## FRUIT SPRAYING, INSECTS AND OTHER ENEMIES OF THE FRUIT GROWER.

By Mr. W. M. Orr, Superintendent of Spraying Experiments.

In conducting the experimental spraying of apple trees carried on by the Department of Agriculture in Ontario, we experimented at twenty-nine points, covering the territory from London to Winchester, a distance of about four hundred miles.

The year 1896 has in many respects been unique in apple culture. It has given us the largest crop of apples that we have ever had. In some sections insect enemies were numerous. In a few orchards there were scarcely any to be found.

The principal insect enemies that we had to contend with were the canker worm, codling moth, tent caterpillar and bud moth.

Most orchards were infested with one or more of these, and some with all of them. The farther north and east we went the fewer insects we found. The opinion was expressed by growers that the frost of June, 1895, had been destructive to insect life, and in this way they accounted for their immunity or partial immunity from their ravages. Others think that on account of the short crop of fruit, they could not propagate as in former years. The canker worm has appeared in many orchards this year where it was unknown before, and some orchards where they have been for years, particularly in the Counties of Wentworth and Brant, have been almost entirely defoliated, many trees being as bare of foliage in July as they are in January. Of course the crop was lost for this year, the trees stunted and no prospect of a crop for next year. There are orchards in which they are allowed to do their work of destruction from year to year, thus perpetuating and extending the evil. It is a question whether we should not have legislation compelling owners of infested orchards to spray them, which, if properly done, will effectually end the trouble and thus benefit the owner and save his neighbors from the pest

Neither this year nor last were favorable to fungus growth, the seasons being dry, but in some sections where we did experimental work this year there was an abundance of rain and a good deal of close hot weather which caused a considerable development of fungus and did serious damage to fruit and foliage where the trees had not been sprayed.

It appears to be beyond question that to grow apples successfully we must spray, indeed I believe it to be as important as trimming, fertilizing or cultivation. The land occupied by the trees is the same whether the fruit is clean or otherwise, and it costs about twice as much to handle a crop of apples when half of them are defective as it does when they are all clean, not only is the labor lost, but in many cases half the fruit which if clean would be clear profit. Thus it appears that the loss on scabbed and wormy fruit is considerable to the individual and to the Province it is enormous.

It may be asked by some, can insect enemies and fungus be profitably controlled by spraying so that we may have clean fruit? We answer yes, and will give you a few instances of results of our work this year in confirmation.

In the orchard of Mr. Jacob B. Shantz, of Waterloo, which had never been sprayed before this year, the results were as follows:

Snow apples sprayed six times in experimental work, 82 per cent. clean.
Snow apples sprayed twice by Mr. Shantz, 21 per cent. clean.
Snow apples unsprayed, 5 per cent. clean.
Newton pippins sprayed six times in experimental work, 67 per cent. clean.
Newton pippins sprayed twice by Mr. Shantz, 50 per cent. clean.
Newton pippins unsprayed, 5 per cent. clean.
Swaar apples sprayed six times in experimental work, 68 per cent. clean.
Swaar apples unsprayed, 4 per cent. clean.

The results would probably have been more marked in favor of the six applications had it been possible to have made them just at the proper time and on a fine

dry day. But the work had to be performed on the dates announced and as a consequence the first and third applications were followed by rain within a few hours.

In the orchard of Mr. A. Pay, of St Catharines, where the experimental spraying for the County of Lincoln was conducted, six applications of Bordeaux mixture and Paris green were given to the experimental plot and three applications to the remainder of the orchard. This orchard had never been sprayed before, and Mr. Pay says that in former years more than one-half of the crop has been wormy and spotted. The following results were obtained :

In Fall pippins which had been sprayed, five barrels of bright clean fruit free from worms, and less than half a bushel of culls, rejected for size, were taken from a tree.

In Fall pippins which had not been sprayed, from one tree, three barrels of fruit were packed. There were not so bright or free from spot as the No. 1 sprayed, and two barrels were culled for worm and spot.

In Greenings which had been sprayed, five men packed 125 barrels in a day and and there were less than five barrels of culls. These culls were not spotted or wormy but undersize. This lot of fruit sold in Glasgow on Oct. 9th at eleven shillings per barrel, the consignee writing that they were very fine.

In Greenings which had not been sprayed, the same gang did not pack more than half as many barrels in a day, although they handled as many apples, so many having to be rejected as imperfect.

In Snow apples the result was very marked. Three trees, which were sprayed three times, gave eighteen barrels of beautiful fruit, free from worm or spot. Mr. Pay says that these trees have borne crops for seven or eight years, but that they have never been fit to pack before. He also considers that the foliage on the sprayed trees appeared more healthy than that on the unsprayed trees.

Mr. W. H. Heard, of St. Thomas, has sprayed his orchard six times this season, and has made a most careful and accurate calculation as to the cost and result.

Paying for a man's time 10 cents, for a boy's 5 cents and for a horse 5 cents per hour. For copper sulphate 6 cents per pound, for lime one-half cent per pound, and for Paris green 16 cents per pound, he has found the cost of the six applications to be 11.43 cents per tree, or one cent and nine mills for a single application.

The chief item of expense is labor, which amounts to two-thirds of the total cost. Without labor six applications cost 4.14 cents per tree, or rather less than seven mills per tree for a single application.

The experiments were made in an orchard of 400 trees ; 125 of which were twenty-nine years old, and 275 of which were eighteen years old.

The result of spraying the orchard of W. H. Heard six times during 1896, cost as above, was as follows :

| Name. | Total. | 1st quality. | Of firsts. | 2nd and 3rd. | Of 2nd & 3rd. |
|---|---|---|---|---|---|
| | Bbls. | Bbls. | Per cent. | Bbls. | Per cent. |
| Greenings | 236 | 216 | 91.53 | 20 | 8.47 |
| Kings | 73½ | 66 | 89.80 | 7½ | 10.20 |
| Baldwin's | 118½ | 111 | 93.68 | 7½ | 6.32 |
| Ripson Pippin | 7½ | 6 | 80 00 | 1½ | 20. |
| Twenty-Ounce Pippin | 22 | 21 | 95.46 | 1 | 4 54 |
| Blenheim | 48 | 42 | 87.50 | 6 | 12.50 |
| Wealthy | 16 | 15 | 93.75 | 1 | 6 25 |
| Snow | 25½ | 24 | 94 22 | 1½ | 5 88 |
| Spys | 19½ | 18 | 92 31 | 1½ | 7.69 |
| Grimes' Golden | 32 | 27 | 84.38 | 5 | 15.62 |
| Romanite | 13 | 9 | 69.24 | 4 | 30 76 |
| Wagner | 27 | 21 | 77.78 | 6 | 22.22 |
| Russett | 140 | 120 | 85.72 | 20 | 14.28 |
| Total | 778½ | 696 | Av 89.5 % | Av 82½ | Av. 10 5 % |

Although the price of apples has been low this year, it is no time to be discouraged Science is coming to our aid, enabling us to control the natural enemies of our fruit. Year by year our fruit is taking a higher stand in the European markets, also in Chicago and the western and southern States they no doubt will eventually become large consumers of our apples, and we are likely at an early date to have a system of cold storage by which we will be able to hold our fruit safely and cheaply until a favorable time for disposing of it. This, together with provision for its shipment by rail and boat in cold storage to England and other distant markets, will materially assist the fruit grower in disposing of his fruit advantageously.

This has been the people's year, a year of advertising Fruits of all kinds have been abundant, we may not have as large a crop again for a decade. Good clean fruit properly handled has brought fair prices in the English market this year, when it was consigned to honest dealers.

But, unfortunately, the curse pronounced upon man for sin is not the only one or the greatest that the fruit grower labors under, and has to contend with. Express and freight rates are too high, and the careless handling of fruit in transit has rendered many valuable consignments almost worthless. But towering over and above all the rest is the dishonest commission merchant who fails to make honest returns, and at a favorable time for himself fails altogether, but does not fail to lay aside for himself the mammon of unrighteousness, and at the beginning of another fruit season he bobs serenely up, scatters his cards and his smiles broadcast, and is ready for another season's plundering of fruit growers. The loss to growers from this source is great, and there is no remedy in sight. Cursing, which is freely and frequently applied, does not cure them, and spraying would not kill them, burning is the only cure and that cannot be applied in time to help the fruit grower.

Mr. HUGGARD: Have you found any evil results from the Bordeaux mixture in spotting the apples that otherwise would have been clean?

Mr. ORR: I have not seen anything or heard of such.

Mr. HUGGARD: I have a tree of Swaar apples and another of Baldwin, both of which were rusted some, and the apples to considerable extent, not injuring the fruit or the productiveness of the tree at all, but rather injuring the outside coating as a perfect apple. My attention was drawn to it by a discussion that took place on this subject in the State of Missouri, showing that the Bordeaux mixture if it was too strong with copperas and not enough lime was liable to affect the skin of the apple or spoil the beautiful glossy effects that the apple produces.

Mr. ORR: I think your statement would probably be correct if the mixture was applied too strong, but we do not apply it too strong. Last year there was a great deal of that rusting on both the apple and the pear, but I have not seen any results of it in our orchards, and we have been spraying for fourteen years. Do I understand that all the trees sprayed were affected?

Mr. HUGGARD: No, only two or three.

Mr. ORR: Perhaps you got it on too strong on those trees.

Mr. PATTISON: Is there any danger to the eyes in the use of this copper sulphate? A case came under my notice in which a young man has almost lost the use of his eyes, it is claimed, from using this copper sulphate.

Mr. ORR: I have not heard any complaints. I think that a sprayer should be careful and get on the windward side of the tree as much as possible, and avoid getting spray in his eyes. I fancy it is the Paris green that does the principal harm More than that, I think the horse ought to be covered. I have heard of it being injurious to horses where the spray fell on them to any extent. Some old blanket can be thrown over them, and save both horse and harness from the material.

Prof. SAUNDERS: I think it is important that every hint from every quarter in regard to marketing the large quantities of fruit now being grown should be ventilated, so that fruit growers may govern themselves accordingly. A few weeks ago, when I was

in Winnipeg, there was a great glut of grapes pushed in there from Ontario, and the larger dealers universally complained of sending grapes in baskets, as far as Winnipeg was concerned. They said they rarely ever got there in good condition. I would suggest that packagas be used similar to those that are sent from California. The price realized from them would be very much larger. I saw some of these baskets of fruit which had been subjected to the jolting for 1,400 miles in a fruit car, and they were not at all in a good condition: they were mussed up and berries more or less broken, and altogether different from the fruit that comes into the Ontario market from California, a much larger distance, packed in a different way. I have no doubt that the ingenuity of fruit growers will soon devise means for overcoming these obstacles, but some attention should be paid to it next year by the Association, or by some fruit growers, so that the package might be varied to suit the market.

The SECRETARY: Did Mr. Orr use the Bordeaux mixture all summer?

Mr. ORR: Yes.

The SECRETARY: In a season like this it would not have been necessary to use much more than Paris green, because there was no fungus.

Mr. ORR: In some sections there was not, but in others there was considerable.

Mr. CASTON: In 1895 I used the Bordeaux mixture according to the formula given in the bulletins issued by the Experimental Farm, and by the stations on the other side, and to insure making it right I used cyanide of potassium itself. There was a long spell of dry weather, and during that time the trees were continually covered with the Bordeaux mixture, and the leaves of the Russett trees were dry and fell off, while those on the Spy were not affected at all. Did you notice any injury to any particular varieties? It seems to me that some varieties are more liable to injury in the foliage than others.

Mr. ORR: The men who did the spraying kept an accurate account of the foliage at each of the six sprayings. We have not a case reported but was in favor of spraying—no intimation of any damage being done to the foliage on any of the trees.

Mr. M. PETTIT: Does. I don't understand whether what Mr. Orr calls "clean" in his percentages simply cover the apples that are clean from the fungus, or the codling moth.

Mr. ORR: Both from the fungus and codling moth—perfectly clean, sound apples.

Mr. PETTIT: That does not prove to us yet that spraying has destroyed the codling moth. While I am free to admit from my own experience there is no difficulty in keeping the fungus in check, I cannot say that I have ever seen very great results in destroying the codling moth.

Mr. ORR: In Mr. Pay's orchard at St. Catharines the principal loss was from codling moth. Over one-half of his apples were affected by the moth in the part not sprayed; in the other there were about twelve per cent.

Mr. CASTON: Entomologists tell us that the egg of the codling moth will hatch out in about eight days, so it is very important to get the spraying on the end of the young apple during that time, and unless it gets poisoned when it begins to bore into the apple it is no use at all. I think the greatest damage is from the second brood.

Mr. PATTISON (Grimsby): I believe most of the damage is done by the second brood, and I think for the second brood the spraying has no effect at all. The season before last, having some leisure time in August, and my apple crop being remarkably clean up till that time, I took the trouble to spray thoroughly with Paris green about the 12th or 13th of August, having observed the second brood beginning to work. I examined the trees afterwards for some time and found that the Paris green had produced almost no effect whatever on the codling moth at that time; but I think it does produce a very considerable effect just after the blossoms are set upon the first crop. I think that it considerably reduced the number of insects available for producing a second crop, and in that way does a lot of good, but I do not think it has any effect at all upon the second crop when it is sprayed directly on these insects.

Mr. Caston: Is there any mixture that will be so disagreeable as to keep those insects away?

Prof. Saunders: I think not. Insects will stand almost anything in the way of disagreeable odors or anything of that sort as long as they are not poisoned. They persist generally in carrying out their office for which they have been designed in nature, and the only way to overcome them is to kill them. A great many of such devices have been tried at different times without much result.

Mr. Huggard: I think one application of the Bordeaux mixture previous to the buds expanding is of more value than any two you might apply afterwards. We make a point of spraying—I don't do it by way of experiment particularly, for I have so much faith in spraying the trees abundantly and effectually that I don't leave a bud in my apples but what is sprayed several times per annum, some four times and some three—and I did not see any perceptible difference when I sprayed after the blossoms had fallen and once before than I did when I sprayed three times after the blossoms fell. Out of some two hundred barrels of apples that we grew this year there was not half a barrel of wormy apples all told, and no scab whatever.

Mr. Orr: I would like to ask Prof. Saunders to give us some information in reference to the second brood of the codling moth and their treatment.

Prof. Saunders: You mean as to the dates?

Mr. Orr: Yes.

Prof. Saunders: I cannot give these just from memory, but the second brood vary somewhat in their habits from what the first brood do, that is in the position in which the eggs are deposited. It is not always that they are deposited in the calyx end of the fruit. I think it is the case with the first brood. The spray falls more or less into this calyx, and the egg being deposited there and hatched in that calyx the young larvæ that issues from the egg has to eat his way through the skin and in that way eats part of the Paris green, and that destroys it. In the second brood the eggs are laid on the side of the fruit, and it is not so easy to cover, and the second brood is not so easy to manage on that account. We find more complaints about injury from the second brood, as a rule, from year to year, than we do from the first brood. Indeed, as Mr. Pattison has remarked, the first brood is not a matter of so much account because the apples that are affected usually fall from the tree when they are only partially grown. It is the second brood that does most of the mischief, but I think that Paris green should be used at least with the second application of the solution, and possibly with the third application, in order to overcome the injury that might afterwards result from the second brood. The dates have been carefully worked out, but that branch has not come under my attention for the last ten years, and I am not able to carry the exact particulars in my memory.

## SMALL FRUITS.

By Mr. J. L. Haycock, M.P.P.

It is with a great deal of diffidence that I undertake to read anything before the gentlemen who are present here from the western part of the Province of Ontario. In this section of the country we are not so favorably situated for the growth of fruits as they are in the west, and consequently our progress has been somewhat limited as compared with theirs. After travelling through parts of Western Ontario, notably through the Niagara district and through the Counties of Essex, Kent and Elgin, and seeing the extent to which fruit growing has been carried on in that section, it makes me feel almost as though I do not want to say anything with regard to fruit growing in the presence of the gentlemen who come from that section. However, we have here to-day a number of farmers from the County of Frontenac, and we find in various parts of the country that the methods of cultivation and the varieties in cultivation that are suitable in one

section are not suitable in another, so that my remarks relate to my experience in this immediate vicinity and are more applicable to this section than perhaps to the Province as a whole, but the paper I shall read contains simply some boiled-down conclusions that I have arrived at after a limited experience in growing small fruits.

It is not necessary to dwell at any length on the importance of the growth of small fruits—at the present time nearly everybody uses more or less—and the consumption is increasing very rapidly. The most important reasons for the increased consumption are, no doubt, first, the lower price of sugar, and second, the improved methods of home preservation. Many of us can remember the days when everything was preserved by the "lb. to lb." method, and when sugar was sold at from 10 to 12 cents per lb. "Making preserves" was a very expensive process and a luxury only to be indulged in by the wealthy. But to-day by the invention of "self-sealing" jars, the fruit can be kept in a more natural and wholesome condition by the use of about $\frac{1}{4}$ the quantity of sugar then required, and then the decreased cost of sugar to less than one-half the former price, makes it possible to preserve eight or ten times the quantity of fruit for the same amount of money as formerly, thus bringing its use within the reach of all classes—sugar used per capita in 1868 was 19.77 lbs.; in 1892 it was 70.50 lbs. The increased consumption of canned fruits has, no doubt, to a very marked extent decreased the local demand for winter apples. No housewife is likely to pay fancy prices for apples so long as she has a good supply of canned fruits of various kinds in her cellar.

A continuation of the low price of sugar and a reduction of the duty on glass jars, would, no doubt, result in a still further increase in the demand for small fruits.

The best location for the growth of small fruits is in the immediate vicinity of a large town or a canning factory. This, however, is not of so much importance as formerly, as, on account of the increased facilities and improved system of transportation, the leading markets are now within the reach of nearly the whole province.

Regarding soil, it is safe to say that any soil that will produce a first-class crop of corn will with proper cultivation produce profitable crops of currants, gooseberries, raspberries and strawberries.

In preparing the ground for a plantation the land should be clean and well fertilized. This is more particularly true with regard to currants, gooseberries and raspberries than with strawberries, as the plantation will last longer and it is very difficult to apply fertilizers after the bushes are set.

One of the best, if not the best, manures that can be applied is unleached ashes. The bushes should be set not less than six feet each way. The first year a row of carrots, mangels or beans may be grown between each row. The best varieties of gooseberries I find for this section is "Downing's," of black currants, "Black Naples," of red currants, "London Red," of white, "White Grape." Of red raspberries "Cuthbert" and "Shaffer's Colossal" are the hardiest and most profitable. Of strawberries the old reliable "Wilson" seems to give as general satisfaction as any.

Now there may be many other varieties very much better than any of these, but my advice would be to go slow with *miraculous* varieties, and thoroughly test on a small scale before planting largely of any new varieties, no matter how highly they may be recommended nor how prolific they may have proven in some other section of the country. Of course it is absolutely necessary to prune raspberries—at least to cut out the old wood and cut back the new; but it is a question whether it pays to trim currants and gooseberries. It is thought by some that it is cheaper and pays better in the end to set a new plantation every five or six years than to expend time and labor pruning an old one. One thing is certain, you will get a much better sample of fruit from young thrifty bushes than from older plants.

Growers of red and white currants and gooseberries will find an enemy in what is commonly known as the "currant worm." These, however, are easily destroyed if proper means are taken. After twenty years of careful observation I find that the currant worm

hatches out just about the time wild plum trees are in full bloom. It appears to take about the same amount of heat and moisture to develop the worm as it does to develop the bud into a blossom. If on the first appearance of wild plum blossoms the currant and gooseberry bushes are examined carefully, there will be found near the centre a few leaves perforated with a number of holes about the size of a pin. On examining the under side of these leaves the worms will be found about an eighth of an inch in length. At this stage they are much more easily killed than later on. A mixture of $\frac{1}{3}$ hellebore and $\frac{2}{3}$ sulphur applied dry with a sulphur bellows while the dew is on the bushes will be found effectual. This preparation not only destroys the worm, but seems to destroy all fungous growth, thus preventing mildew on gooseberries.

There are usually two broods of these worms in a season, the second one appearing just about the time the fruit is maturing. Many neglect their bushes at this period, some through fear of injuring the fruit and others who think that, now that the fruit is about matured, it will not hurt the bushes if the leaves are taken off. This is a sad mistake. The blossom buds for the next year's crop are formed during the month of September, and if the worms are allowed to strip the bushes in July, the sap of the bush, instead of developing fruit-bud, will be exhausted in forming a new set of leaves. On bushes treated in this way very little if any fruit need be looked for the following year.

Let me say a few words with regard to the importance of growing small fruits in the vicinity of Kingston. After making careful enquiry and after an observation of many years I find we do not grow enough small fruits here to supply the local demands of the citizens of Kingston. Last year after making as careful an estimate as possible I found that we imported into this city from outside growers, that is from Prince Edward county and points from twenty-five to forty miles away from here, small fruits amounting in the neighborhood of 200,000 or 300,000 quarts representing a value of from $15,000 to $20,000. Now every quart of that fruit should have been grown and every dollar of that money kept within a radius of twenty miles of this city. We have a soil as suitable as there is in any other section; we have the intelligence, and we have the market here at our own door, and there is no reason why every bit of that fruit that is imported and sold on the market in this city should not have been produced within a ten or fifteen miles radius. Our growers have the soil and intellect and the industry and everything necessary except the enterprise and the knowledge of the growth. I hope they will supply themselves with the knowledge and bring into use the enterprise necessary to produce all the fruit necessary for local supply. This would be a benefit in more ways than one. All the money paid for fruit imported is expended in other towns and cities, while every dollar's worth that is grown in the immediate vicinity of Kingston and the money handed over to those living in this locality who do their business in this city would be expended here. Now I am very pleased that the Fruit Growers' Association have come to this section, and to see so many residents of our locality present, and I am sure if the Association should visit us again they would find a larger turn-out than we have at present. (Applause)

The PRESIDENT: I am very glad that our meeting has awakened such an interest in small fruit growing in this vicinity and will probably bring about the result that Mr. Haycock desires, that the local market shall be in a great measure supplied at home, although I fear it will so greatly add to the woes of some of our western friends as expressed here, that they may even condemn us as a society. However, I think these things will all work out for good in the end. We should be glad to hear experience of local men and others on this subject.

Mr. HUTT: I wish to take exception to Mr. Haycock's remarks as to pruning currants and gooseberries. I think there is no doubt in the minds of those who are growing those fruits that it does pay to prune them. No doubt it would pay the nursery men if we could plant out a new lot every five years, but I don't think it would pay the grower. He rightly says you get better fruit on the young bushes than you do on the old. You certainly would if they are not pruned, but if you prune carefully and have new wood coming on you would get better results with old bushes and probably more fruit than

with young bushes. Our plan of pruning is to start with the young bush and leave about six branches to form the bush, and then we carry on a sort of renewal pruning on that. Every year we cut out two of the oldest branches and let two of the stronger branches coming up take their place so that we always have young and thrifty bearing wood that would give large fruit.

Mr. PATTISON: What time of the year do you do that?

Mr. HUTT: We usually prune them in the spring. Of course it may be done in the fall.

Mr. CASTON: Does the one estimate apply equally to red and blackberries.

Mr. HUTT: It is better to simplify the matter to say yes, although probably when you come to grow them you will soon find out for yourself that the black will not answer with the same pruning as the red. You want the strong young shoots of the black kept renewed to get good fruit.

Mr. FISHER: What about pruning red currants; is it not necessary to cut red currants back?

Mr. HUTT: The system often adopted is to shorten it back about one-third or one-half. You get a nicer shaped bush that way to work around; and still others recommend, instead of letting new wood come out, to keep cutting it all back and grow about six long canes. In this way you can pick in one-half the time.

Mr. FISHER (Burlington): I have found it necessary to cut red currants back. One reason is that after the branches are allowed to grow long the weight of the crop will bring them down to the ground and the fruit will be covered with soil in case of storm, and another reason is that if these shrubs are stiff, the weight of the crop being so far from the point of junction with the main stock, these long branches are broken off.

A. M. SMITH (St. Catharines): I understood Mr. Haycock to say that any soil that was adapted to corn growing would be suitable for small fruit, but I think there is a good deal of low ground that is high enough for corn growing and would produce usually a good crop of corn, that would not be at all adapted to small fruits on account of being too wet in winter. Fruit plants, like human plants, do not like wet feet.

The SECRETARY: I would like to corroborate Mr. Hutt as to the lengthening of the currant's productiveness by cutting the bushes well back and cutting out the shoots, and encouraging the growth of young suckers from the roots. I have a plantation that has been out for twenty years, and is just as productive as ever because of this method of treatment, so I think we can prolong the productiveness and the profit of a plantation of currants in that way almost indefinitely.

Mr. WHYTE: I would put the London Red at the bottom of the list as the poorest currant that grows in the country. If we are going as a Society to advise the cultivation of any particular kind of fruit it should be a good one. Anyone that has had experience with Fay or Wilder or Moore's Ruby will admit it is very inferior fruit. It is small, it is very acid, almost acrid; it is a good bearer, but no better than either of those I have mentioned. With regard to the application of hellebore, it seems to me a great waste of time and money to apply hellebore at all in the spring; Paris green is so much cheaper and efficacious and perfectly safe at that time of the year that it is not worth while to apply hellebore. The application of Paris green about the 20th May is perfectly efficacious. For the second brood I would never think of applying the material dry. By applying it wet with a spray pump you get over your work in a quarter of the time and at about a quarter of the expense for material, so it is a great mistake to use hellebore dry under any circumstances, and either dry or wet in the spring.

The SECRETARY: I think it is the best way after the currant worm has made some expensive ravages and is rather abundant on the bushes to spray, because you must spray your whole plantation; but if you begin early, before the worm has begun to make extensive ravages you can work in the simpler and quicker way. They begin

work at the interior of the bush and there you will find those holes that indicate their ravages. If you begin early in the season you can take a tumbler with netting for the top of it, and dust the bushes with hellebore and go over your plantation much more quickly and with much less cost than if you have to draw a great quantity of water and mix a great quantity of material and go about it with a spray pump.

Mr. BEALL: I understood Mr. Haycock to say he would recommend the Downing above all other gooseberries to grow. I would like to ask if he has ever grown the Pearl or Whitesmith, or any other of the English gooseberries. If he had he would scarcely have said that the Downing was the most profitable. For some years past the Downing and even the Pearl would scarcely pay for picking where there is a very large quantity grown; this year the Whitesmith would sell for nearly three times the price of any other variety in our market at all events. In regard to spraying I must disagree entirely with our friend, Secretary Woolverton I never spray my gooseberries and currants but once in the season, and that is when I find the first sign of the pin holes in the berries; but then I go over them thoroughly; there is not a leaf left; the spray is forced into the berries from every side, and that is all that is done for the season.

The SECRETARY: I never dust them but once.

Mr. DALY: There must be a difference in the habits of the saw fly in your neighborhood and in ours.

Mr. HAYCOCK: I have tried the Whitesmith, and the first berry I ever tried extensively was the Smith's Improved. We find it and all others in this section of country are liable to mildew. I would not put out a plantation of Smith's Improved or any English gooseberry in this section of the country if you would give them to me. The reason why I adopt the dry system of spraying was simply to save time. I have put on hellebore with a bellows on 600 well-grown bushes before breakfast in the morning frequently, and it would take me half a day with a watering-can or a sprayer. Another reason for putting on the hellebore is that I always mixed the sulphur with it, because I believe the sulphur is a good thing to prevent fungous growth on the foliage of different kinds in a bush anyway. In regard to pruning I was not very rigid in my remarks; I said some thought that it would be better not to prune. For my part I am one of those that think it does not do to prune currants or gooseberries. My experience is that if you have got a plantation set out and growing it is very difficult to apply fertilizer to it unless you go to the labor of wheeling it in with a wheelbarrow. If you go in with a cart or wagon you are liable to break your bushes down. I therefore think that if you get a piece of ground in a high state of cultivation, put on a plantation of gooseberries or currants, run that for five or six years, you can then set out a new plantation on a new piece of land properly prepared and have them come into bearing with far less expense than to turn up your old plantation and put it into shape. I am speaking now of doing it on an economical basis, and I believe there can be more money made, when you take the cost of labor into consideration, out of currants or gooseberries that are planted alternately in patches for five or six years and then rooted out and the ground thoroughly cleaned and manured again and a new plantation put out It is a great deal more labor to make a plantation clean and free from weeds, and on the whole I think it is more profitable to set up a new plantation every five or six years.

The PRESIDENT: Has anyone something to say on varieties?

Mr. HAYCOCK: Mr. Whyte, of Ottawa, placed the London Red last in the list. Well, I have tried the Red Cherry and I would not advise anybody, unless it was some man against whom I had some spite, to set out Red Cherry currants in this section of the country. The weight of the snow in the winter here is liable to break them down, as the Cherry currant is very brittle. The London Red may not be properly named, but the trees I got from Messrs. Leslie & Co. grow a large long bunch filling clear to the end, and when sold in the market is almost equal in size to the Cherry currant, and so far as bearing is concerned we can always get double the number of quarts off a London Red bush that we could off the Cherry. I have never had experience with Fay's Prolific.

Mr. DALY: What is Mr. Hutt's opinion about shortening the gooseberries during growing season?

Prof. HUTT: I cannot say I have had experience of that; I never thought there was anything to be gained by that.

Mr. RACE: It seems clear to me that Mr. Haycock has not got the London Red. From the description of the berry he has given us I would say it is more like the Versailles. His description does not meet the London Red at all. I have grown it, and I would not have it on the premises if I could get the Cherry or Fay's Prolific. I would even prefer Moore's Ruby. I have grown the Whitesmith for a number of years and also the Pearl, and I consider that I could get one-third more berries off the Pearl than the one he named, but in my opinion the Whitesmith is the most profitable of all the gooseberries. It is a rank grower, a heavy bearer, and can be kept clear of mildew with very little difficulty.

Mr. WHYTE: A very important consideration is the character of the soil. If there is a light sandy soil there is no use in trying gooseberries, but if you have the right kind of soil you will get more fruit from the Whitesmith than any other berry. We have very little trouble with mildew, practically none.

Mr. DALY: Of all the red currants that are grown to-day in Canada, I think Fay's Prolific heads the list. I think it is the finest quality, and it is an annual bearer, and taken on the whole, you will get better currants and better crops than from any other.

The PRESIDENT: I would like to hear from Prof. Craig.

Prof. CRAIG (Ottawa): If you are going to grow for market I would not recommend Moore's Ruby or Wilder; they are fine in quality but do not produce, except possibly under the favorable circumstances that Mr. Whyte is able to give them in his garden, as much as other varieties such as Cherry or Grape. That is my experience. With regard to black currants, we have one or two saplings that have been fruiting for one of two years, that are more attractive than any named varieties that we have on trial. We hope in the near future to have these sufficiently decided so as to give some plants to the Association. One of these has already been sent out and favorably reported on by Mr. Young, of Cornwall, in the Horticulturist under the name "Success." Mr. Young happened to recommend the variety when he was visiting the farm some time ago, and to call the attention to the fact that he had a plant, but did not know where it had come from, and I found it came to him by way of the Society from the Experimental Farm. My experience coincides with what has been given, that the Pearl heads the list of American varieties for productiveness, and general vigor of plant and as a commercial variety. With regard to the European sorts, of which we might take the Whitesmith as a type, we should plant them with our minds made up that they need special conditions. In the first place if we are not prepared to spray them perseveringly, and every year we need not plant them; and in the second place they require a clay soil, not wet, but still rather damp, and I find that they do best if you can so arrange your plantation as to give them partial shade. Our hot eastern and Ontario suns here induce a powdery mildew that attacks the fruit: still if one has right conditions and is near a good market I would recommend him planting the Whitesmith, and Keepsake is another variety that has done well with us.

Mr. MORRIS (Welland): Mr. Haycock, I dare say, would like to have a tariff against outsiders coming into Kingston. As it is impossible for him to have that he gives advice that points in that way—recommends a poor kind of currant: but I believe that he is rather honest in that after all, because I believe the currant he speaks of is not the London Red. From his description of it it is the Prince Albert. (Laughter). I think he is certainly wrong in not trimming his bushes, for even if he renews every five or six years it is a great deal of trouble to dig out the bushes. One of the best fertilizers for currants is the muck out of swamps. Put it in the ground in the fall or winter season and it will give you great satisfaction.

## REPORT OF COMMITTEE ON SCORE CARDS.

The following report of Committee on Score Cards, was presented by Mr. T. H. RACE:

Your committee met at the office of the secretary, and after carefully considering the whole matter concluded that the cards first proposed were too cumbersome, and that a simpler form would be more practicable. The following forms were agreed upon for use in collections:

### SCORE CARD FOR APPLES AND PEARS.

| POINTS. | VALUE. |
|---|---|
| Color | |
| Size | |
| Quality | |
| Commercial Value | |
| Total | |

N. B.—Maximum of Points for each plate, 10.

### SCORE CARD FOR GRAPES.

| POINTS. | VALUE. |
|---|---|
| Color | |
| Size of Bunch and Berry | |
| Form of Bunch | |
| Flavor | |
| Total | |

N. B.—Maximum of Points for each Plate, 10.

The committee recommend that this card be furnished the secretary's of the principal fairs for use in 1897.

Mr. RACE, for the committee, said that the board of directors thought that the score card arranged a year ago was too cumbersome hence it had been simplified as now produced (specimens distributed). As to the utility of score cards there is quite a variety of opinion. Even with this simpler form of card I find it very difficult to go over a large collection of apples at the agricultural fares, because no agricultural society would pay you for the trouble of going over their fruit list and laying these score cards upon them. The object of these cards is to judge the fruit on points—color, size, quality and commercial value. It is considerable trouble to do this, and althought it is the better way, and the only real way to arrive at a proper judgment, yet to carry out this plan the societies will have to pay the judge for the time occupied in it. Instead of using these cards at London last time I had a clerk with me who took note of my points. There were twenty-two exhibits of ten varieties for family use—one summer, one later summer, two fall, and so on spread over the whole season. The first thing I did was to run over

and see if they properly covered the season, and if they did not I ruled them out. I went over the others and called out to the clerk the points that were given by this board as published in our magazine. The highest is forty points, and they are to be judged by the color, by uniformity in size and by perfect specimen of apples. In that way I can go over a large number of collections in a very short time. Of the twenty-two varieties in London I had eight ties, so I had to go over all those in the same way. A mistake exhibitors often make is to place a large specimen apple on top, fancying that he is going to bring his specimen up in quality, but the judge has to reduce the score on account of lack of uniformity. Now, if I were to use these score cards in a matter of that kind to make them all out it would take me much longer time, and there are very few societies that are willing to pay a man for doing that. However, the score cards are before you and we wish to know what you think about them.

On motion the report was received and ordered to be printed in the annual report.

## DOMINION FRUIT EXPERIMENTAL STATIONS.

The PRESIDENT proposed a discussion on the question in the question drawer "Should we have a Dominion Fruit Experimental Station in Southern Ontario; if so, for what purpose and where?"

Mr. E. D. SMITH: It seems to be very desirable that there should be a fruit experimental station in Southern Ontario, for that is where most fruit is grown. Hitherto most of the experiments have been conducted in Northern Ontario, originally at Guelph, latterly at Ottawa, where the experiments are of very little use for growers in the southern part.

Mr. M. PETTIT thought it would be desirable if we could have one established. He supposed it would be in a manner connected with the Central Experimental Farm at Ottawa, a sort of branch for them for testing more tender fruit that they cannot succeed with there.

The PRESIDENT called upon Prof. Saunders to speak on the subject, remarking that evidently not much consideration had been given to it, mainly from the fact, he presumed, that the Ontario Government had taken up experimental work at so many different points which will cover nearly every latitude in Ontario.

Prof. SAUNDERS said: I have no suggestions to make at all. It was the suggestion of the Secretary that I should stay over and hear the discussion that might arise in connection with this subject. I may say that for the past four or five years petitions have come in mainly from different parts of the Niagara peninsula, and presented to the Minister of Agriculture requesting that a fruit station be established for the purpose of testing fruits in the Niagara peninsula, fruits that cannot be tested at Ottawa, and urging that it would be of great value to the fruit growers of that part of the country. I think myself, now that the Ontario Government has taken it up, that the ground is fairly well covered, and under the plan which has been established it admits of the testing of all varieties of fruits—of peaches, for instances, in one district most favorable for that fruit, pears in another district where pears are known to be grown with very great success, and so on through the whole series, and it does not appear that there is any special need for the establishment of a fruit station by the Dominion Government under these circumstances. As long as the fruit growers of the Niagara peninsula are satisfied with the existing arrangements there is no disposition on the part of any one at Ottawa to open up the question. I am very glad indeed to find that members of the Association are satisfied with the existing arrangements, and I hope the experimental stations conducted by the Provincial Government will be eminently successful and meet the views of the fruit growers in the different parts of the country. At Ottawa we shall be glad to do all we can to assist the experimental stations at the different points of Ontario with any scions or plants of anything we may have that it is desirable to test in those parts of the country

Mr. SHEPPARD: I take the view that it is very necessary for us to have an experimental station in the Niagara District, because I claim that the experiments carried on by the Ontario Government do not fill the bill. As I understand, it is simply to test new fruits, but the scientific treatment and study of the diseases affecting fruits is being entirely overlooked, and I think a station that would take up this view of the subject, as well as the practical experiments of fruits, would be of great advantage. I do not think the fruit growers need so much new fruits as the cultivation of the fruits we already have, and the bringing of those fruits to perfection and saving them from the ravages of different insects and fungous diseases that are attacking them at the present time.

The PRESIDENT: I wish to correct an error into which Mr. Sheppard has fallen regarding the work of the experimental stations already established by the Provincial Government. It is not altogether for the testing of new varieties: in fact the experimenters were chosen in most instances where they had already a good supply of the older varieties under cultivation upon which we could operate and get reports immediately. Of course as new varieties come out they were added to the collection, but in each instance in the district in which we have established an experimental station we have selected men who have taken a deep interest in the matter, who have already quite extensive orchards, and who have been able to give us, as you will see when the next report is published, valuable information and reports on the older varieties, and in some cases many new varieties of fruits. Then as regards disease, both insect and fungous, that is a matter that is under contemplation; we intend to take it up just as fast as it is possible to do so. The spraying operations have been conducted on quite an extensive scale and much valuable information and that which has been very instructive to the fruit grower has been the result, and these we believe it is contemplated to carry out very extensively each year.

Mr. E D. SMITH: I am sure there is no apathy on the part of the fruit growers of the Niagara peninsula in regard to these experimental stations. It is not apathy that makes us say so little about it, but it is rather the desire to give the present Ontario Fruit Experiment Stations an opportunity to show what they intend to do. We feel of course they have begun on a small scale, but we expect and fully believe that they will extend as time goes on, and that the experiments will include not only those you have mentioned but all experiments in connection with the growing of fruit. If we thought otherwise we would be up in arms at once to ask the Dominion Government or any other Government that would assist us to have an Experimental Station there, because we have felt for years past the great necessity of that, and we were so delighted when these were established that are established that we feel like letting them have a good chance to show what they can do towards filling the bill. Each fruit grower has been conducting experiments on his own plantation at an expensive rate in times past that could have been conducted a hundred times more economically at an experimental station.

Mr ORR. I feel it very desirable indeed that we should have an Experimental Station in Southern Ontario. I am satisfied that there are many varieties of fruit that we ought to grow that ought to be tested here. When I was collecting fruit for Chicago I found figs at Niagara in a full state of perfection and picked them and sent them there. Now that was a surprise to many of us. I think we ought to have an experimental station, and I think it ought to be located somewhere about Fruitland, which is the freest from frost that I know of in the country. Our flowers were blooming there up to last week, and along the mountain side are blooming still. My vineyard has been there for over 30 years and we have never lost a crop from frost either spring or fall.

Mr. A. M. SMITH said; I have not been present to hear the arguments advanced, still I would agree with Mr. Orr that there is a necessity for a larger work than is being done by the Ontario Government or is likely to be done for many a day. In mentioning figs he foregot to mention some other things that are perhaps not at Fruitland but in the vicinity of St. Catharines. (Laughter.) English walnuts and almonds and the like of them. That is a line that I have. The matter of nuts alone it is an important one even to the commerce of this country. (Hear, hear.) I am not in possession of the amount

imported, but it must be a very considerable amount, and I think that the Southern portion of Ontario would be able to produce large quantities of nuts such as the English walnut and filbert and perhaps some variety of almond. It has occurred to me that a fruit growing station in connection with the testing of some of the tender varieties of grains and vegetables and such products that cannot be grown in some of the cultured portions of the country might be conducted there. Those of us who are engaged in fruit growing in our section know that it is becoming a difficult matter to obtain fertilizers, and I think it would be a great help to us if we could obtain assistance in the matter of testing fertilizers, of which we shall soon need large quantities for producing fruit. I have always asked for an experimental station in the Niagara District. I am not particular where it is located—at Vineland or St. Catharines or even in Essex.

Mr. HUGGARD: Unless we purpose going into lemons and oranges and figs, etc. I do not see where another Experiment Station is going to be of any advantage to the general growing of fruits in Ontario. The number of fruits that have already been grown and tested in that district are well known, and when they get outside of that particular district we know that they will not succeed so well. I think it would be a large expense for very little profit inasmuch as a small area of our great country could possibly produce what could be produced in the Niagara peninsula, and therefore it would be only servicable for the southern portion of the Province to establish anything in the shape of tender fruits that we have already under cultivation in that district.

Mr. WHYTE (of Ottawa): I think it is notorious that our present system of experimental farms are very much hampered for the want of funds, and it would be a great mistake to fritter away any funds that are appropriated for that purpose until the present work is brought to a better state of efficiency. There is an immense amount of work that could be done at the present stations, that applies to the whole country. That work is not done as well as it would be if we had more funds. It would be an advantage to the Niagara section to establish an experimental station, but that would be of very little benefit to the whole country. I think we had better wait to see how our present system works before we think of establishing another one.

Mr. BURRELL (St. Catharines): Perhaps it is in order for me to speak, who am supposed to represent an experiment station. The Board of Control have given me to plant this year to a considerable extent apricots, nectarines, Japanese chestnuts, mulberries, and although they have not got into figs, lemons and so on there is no knowing what they may ask me to take up later on. (Laughter.) I have taken up probably a good many varieties that there will never be any money in for me, probably never any money in for anybody, because I do not think we can get into the banana trade with a great rush in Ontario. (Laughter.) At the same time I feel like Mr. Smith if this thing were not to develop it is hardly worth establishing at all, and if it were not to I should be in favor of establishing an educational station at once and work for it and have it thoroughly developed; but it certainly must develop if it is to be of any value at all. We feel that we should not only test new varieties but carry on experiments with fertilizers and insect and fungous diseases to a considerable extent. I look upon fungi and insects as the most important things we have to contend with. We have done something with them already, but with the help we expect to get we should hope to go into it far more extensively in the future.

Mr. SHEPPARD: The experimenters themselves are practical fruit growers, men who are making a living out of this business, and probably have given a great deal of study to particular lines, but not to the particular scientific lines of fruit growing. In a great many cases they are not able, from their training, to take up this matter in a scientific way. I know if we want any information in our section in regard to a great many troubles we have there, we have to send down to the Experimental Farm at Ottawa to Prof. Craig or Prof. Fletcher or some of the other gentlemen there for information, while in a great many cases I know they have made trips up here. Prof. Fletcher was at my place and on my neighbor's place two or three times examining into a little borer that is troubling us with the peach trees. We have not been able to get any remedy for

that, and the trouble is we are not able to give these gentlemen the information that they require when they come. We will be asked when this borer does so and so; when we saw it and when we did not see it, and when it lays its eggs and when it hatches out. Now, what ordinary practical fruit grower can give that information to Prof. Fletcher when he asks? I cannot, and I have given this matter a good deal of attention, and I feel that there are hundreds of others that know the practical result of the borer, but cannot give the scientific information that is necessary for these gentlemen before they can deal in a practical manner with this subject. That is only one subject, and these things are very common with all fruit growers. I do not think it would be necessary to have a more expensive experimental station, but some man there devoting his whole time, some man trained for this very work. At present I do not think that we pretend to experiment in testing varieties, spraying, etc. I feel very grateful to the Government, and am quite anxious to assist the present stations to do what they can do, but I do not think they fill the bill.

Hon. Mr. FISHER: Perhaps it is not quite right that I should take part in such a discussion as this, but I confess that the tenor of it has been of the greatest value to me and will be in guiding me in the future. There are just one or two points to which I would like to draw the attention of those who have taken part in this discussion. In the first place, the request is for a station at a particular locality for a particular purpose. I may say that in addition to the demands from that section for a particular station there are large numbers of other demands from other parts of the country for other purposes just similar to this. The other day, the Nova Scotia fruit growers earnestly demanded that I should have an experimental station there for fruit growing, and so on. I have no doubt that in a very short time other demands of a similar nature will be received from other parts of the country, and it certainly would be the case were this demand to be seriously entertained. I therefore wish to point out in the first place that the present votes for the purpose of carrying on experimental farms would not be sufficient to add this serious undertaking, because though Mr. Sheppard said it would be a very small one in this particular instance, it will immediately develop into a very large one when you take into consideration the other parts of the country whose demands would have to be met. The Department of Agriculture at Ottawa is the Department which has charge not only of the Province of Ontario and of the Niagara Peninsula, but of the whole Dominion, and if we established a branch experimental station in the Niagara peninsula we would find it very difficult indeed to refuse other sections of the country similar branch experimental stations. So far the demand for such branch stations has not been great, but I confess that I should be loth to start out on such a journey with very little knowledge of where it was going to lead me to. Further, I would like to point out that while the Dominion Government is doing a certain work and the Ontario Government is doing a certain work, the money that goes to pay for that work all comes out of the pockets of the people; it matters very little whether it goes through the hands of the Dominion Government or the Ontario Government; and it seems to me very unfortunate indeed that the same kind of work should be paid for twice over, and that experiments should be carried on twice over by two sets of people but all paid for by the same people. I think the people of the country would rebel against that, and that they would say that it was unbusinesslike and an unpractical way of conducting the affairs of the country—not the particular affairs of the Government at Ottawa, not the particular affairs of the Government of Ontario, but the affairs of the people of Canada, which is really what the Governments at Toronto and Ottawa are trying to do. If we multiply our stations it means that the people of the country are going to have to pay in many instances for double work being done at two different places. I think it would be unfortunate that the powers at Ottawa and Toronto would be overlapping one another in the fields which they undertook to do, and knowing Mr. Dryden as well as I do I think there is no danger whatever but that he and myself, as far as matters connected with Ontario are concerned, can come to a thorough understanding as to what work each of us will be able to do to the best advantage of the people of Ontario. As to experiments in fertilizers, it seems to me they would be just as valuable for the

people in St. Catharines or in the Niagara peninsula if conducted at Ottawa as they would be if conducted in the Niagara District itself. Wherever fertilizers are tested there is almost a certain amount of result due to the particular land on which they are tested, and we know perfectly well that the fertilizer which will succeed well on one farm may not succeed on the farm immediately adjoining it, let alone in a different country or a different section of the country, and the result of fertilizers in any place are not absolutely sure in regard to any other place; but I am satisfied that the results of tests of fertilizers on the four or five Dominion experimental farms which are now being carried on will give a fairly good idea of the value of the various fertilizers that are tested I wish to point out that the tests of fertilizers on the Dominion experimental farms have been conducted now for a series of years and are of great value in regard to all the fertilizers that are on the market at the present time in this country. I just wished to express these views, although I feel already by the expression of members who have spoken that these matters have evidently received some attention and I do not fear at all that unreasonable demands will be made upon my Department. (Applause.)

The SECRETARY read a letter from Senator Sanford and said that he hoped that we would have had time to discuss the question the Senator had introduced as to the establishment of a Canadian fruit depot in England. If, after providing cold storage and transportation, carefully inspected stock could be placed in a depot in London, England, and sold there, it would be the greatest advertisement for Canadian fruit that could be possible and would serve to create a demand for the stock which might be forwarded in other ways by this country to Great Britain.

Mr. M. PETTIT: Would it be out of order to refer that subject to the committee appointed to confer with the Hon. Minister in regard to the subject of cold storage.

The PRESIDENT: I think that the suggestion is very good, and that the matter might be referred to that committee.

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## ORCHARD COVER CROPS.

By JOHN CRAIG, HORTICULTURIST, CENTRAL EXPERIMENTAL FARM OTTAWA.

Suitable cover crops to protect orchards are of great importance in all fruit growing sections. In northern regions, the practice of sowing a crop after cultivation ceases that will at once enrich the soil and protect the feeding roots of the trees is one of the essentials towards success and an item in the annual programme of orchard management that should never be omitted. The late P. C. Dempsey, of Trenton, recognized the truth of these statements years ago, and frequently expressed himself to the effect that a cover crop of weeds in the autumn was far better, considered in the light of what was best for the trees, than no cover crop at all. The healthy and profitable orchard of apples and pears which he left and now managed by his worthy son W. H. Dempsey, of Trenton, furnishes ample proof of the benefits of the system.

*What the meaning of Cover Crop is*—In brief, it means sowing in an orchard after cultivation ceases in summer, such a crop that will protect the roots of the trees by preventing at once alternating freezing and thawing and deep freezing and thus mitigating the injurious effect arising therefrom; that will add something—the more the better—to the fertility of the soil when turned under; that will improve its tilth or mechanical condition; and lastly, that will occupy the ground to the exclusion of such plants as may wander out of place--weeds, When soils, especially those of a clayey nature, are

constantly cultivated without being subjected to the ameliorating influences induced by producing some kind of vegetation, not only do they become mechanically unfitted for the production of healthy and vigorous plant growth, but the food which they contain may take on forms not readily assimilable to plants. In northern sections, perhaps the strongest reason that can be urged in favour of the practice is the protective influences cover crops exert against the often severe root injury wrought by sharp frosts to trees growing upon bare soil. Speaking of injury of this kind, Professor Hartig says:—

"Roots of all young trees, even forest trees, may be killed if severe and long continued frost finds the lighter classes of soil unprotected by snow or any other covering. The periderm of the roots is thinner than on the stems and consequently the former are less protected and, moreover, growth is active for a longer period in roots, when, in mild climates, it continues till the middle of winter, so that when frost occurs the tissues are not in the inert condition which assists them to resist cold. Such plants burst their buds in spring, but wither up whenever transpiration from the delicate young shoots has exhausted the stock of water." An occurrence of this kind may wipe out in a single winter what was a promising young orchard As the trees grow older and become deeper rooted, the danger naturally lessens. Certain portions of the Central Experimental Farm cherry and apple orchards upon light soils under clean cultivation were almost totally destroyed in this way last winter. The temperature fell and remained at or about 20 degrees below zero for some days towards the end of December when the ground was entirely unprotected by snow. The cherries were mainly root grafted or budded on Mahaleb stock, the apples were budded and grafted on French crab stock. The character or variety of stock seemed to have less to do with the extent of the injury than the nature of the soil. In those portions of the orchard where a hard and impervious sub-soil approaches the surface the injury was greatest. The twigs and branches retained their plumpness till the commencement of vegetative process; the flower buds, with which the trees were thickly covered, opened or partly opened, as the case might be, and in some instances fruit set; the leaf buds usually made an attempt to do their duty, but failed to more than half develop leaves. By this time the twigs were much shrivelled, and the store of food having become exhausted the trees gave up the struggle and died. On digging them up, it was found that in nearly every instance the upper system of roots was entirely killed, and while the lower or tap roots were alive towards their lower extremities, the superior portions were entirely killed. A lesson of this kind need only be learned once, and strongly emphasizes the desirability—if not necessity—of protection from that standpoint.

*Cover Crops Tried.*—In 1895 a number of plants were tried with a view of ascertaining some facts regarding the advantages of each in this climate. Half an acre each of the following fodder plants were sown on with a light seeding of rye at the rate of one and a quarter bushels per acre.

No. 1 Crimson Clover. ..... 20 lbs. per acre.
No. 2 Mammoth Clover. ..... 12 lbs. per acre.
No. 3 Alsike Clover. ..... 12 lbs. per acre.
No. 4 Alfalfa. ..... 15 lbs. per acre.
No. 5 Common Red Clover ..... 12 lbs. per acre.
No. 6 White Clover and Orchard Grass. .....
No. 7 Common Clover and Orchard Grass. .....
No. 8 Pease. ..... 2 bushels per acre.

The following notes show the condition of these late in the autumn and early in the spring:

| Plant. | Condition. | | Remarks. |
|---|---|---|---|
| | Fall, 1895. | Spring, 1896. | |
| 1. Crimson Clover | 2 to 4 ins. high; smothered by rye; light covering by first frost. | Entirely killed out; no plants to be seen May 12th. | Smothered by rye. |
| 2. Mammoth Red Clover | 2 to 3 ins. high; weakly; ground fairly covered by rye. | Light cover; best where unprotected by rye. | Fairly good |
| 3. Alsike Clover | 2 ins.; very light covering; poor catch. | Wintered well; fair cover where alone. | Fairly good. |
| 4. Alfalfa | 6 to 8 ins.; good catch, showing well through rye; tops killed by first black frost. | Wintered well on low ground; killed out on knolls. | Good. |
| 5. Common Red Clover | Very weak; nearly crowded out by rye. | Badly killed; very light cover; patchy. | Too weak. |
| 6. White Clover and Orchard Grass | No improvement over last. | Killed out | Too weak. |
| 7. Alsike Clover and Orchard Grass | Better than last; cover light but fairly even. | Light crop on low ground. | Too weak. |
| 8. Crimson Clover and Orchard Grass | Crimson Clover weak; Orchard makes good showing. | No clover; Orchard Grass makes some show. | Too weak. |
| 9. Field Pease | Nearly crowded out by rye. | Only rye left | Smothered by rye. |

Summing up the conclusions, I would say, 1) Rye sown at the rate of one and a quarter bushels per acre proved too heavy a seeding for most of the clovers and prevented their full development; at the same time it furnished a certain amount of protection. (2) The seeding down took place about one month too late to secure the best results in the locality of Ottawa (3) The best cover obtained was given by (*a*) alfalfa, (*b*) mammoth red clover, (*c*) alsike clover and orchard grass.

*Cover Crops Tried, 1896:* Upon the same piece of orchard soil as that used in 1895, one acre each of the following crops were sown on July 13th, 1896. These were seeded alone and were lightly harrowed and rolled:

| | |
|---|---|
| Crimson Clover | 20 lbs. per acre. |
| Mammoth Clover | 15 lbs. " " |
| Alfalfa Clover | 15 lbs. " " |
| Common Red | 12 lbs. " " |
| Soja Beans | 60 lbs. " " |
| Cow Peas | 2 bushels per acre. |

*Crimson Clover:* Appeared in five days, even, fairly strong. August 12th, three inches high, covering ground fairly well; strongest in partial shade. October 14th, strongest plants fifteen to eighteen inches. On lighter and poorer parts plants rather weak.

*Mammoth Clover:* Appeared rather sparsely in six days, August 12th, growth moderate, weeds principally "purslane." Taking possession October 14th. Strong, even growth throughout; average twelve inches high, giving a close, heavy covering.

*Alfalfa:* Came up in five days, remarkably even and strong catch. August 12th, eight to ten inches high, completely covering the ground. October 14th, knee high, very uniform. Growth, strong, even on light sand.

*Common Red:* Appeared unevenly in six or seven days. August 12th, two to three inches high; ground partially covered. October 14th, six to ten inches high; rather thin here and there. Not heavy enough.

*Soja Beans:* Appeared promptly and evenly in five days. August 12th, plants eight to twelve inches high, vigorous. October 14th, quite black and leafless; killed by first frost; ground practically unprotected.

*Cow Peas:* Germinated evenly in five or six days. About right as to quantity; making strong growth. August 12th, plants ten to twelve inches high, nearly shading ground. October 14th, exactly the same condition as soja beans.

The information to be gained by the condition which the different crops came through this winter is necessary in order to arrive at satisfactory conclusions. From present appearances, the mammoth clover seems to furnish a cover which, if not ideal, yet appears to be such as to place it among the most useful of the available plants for this purpose. Alfalfa has certainly done well and I believe could be used with advantage on sandy or gravelly soils. Crimson clover grows rapidly and forms an excellent cover, but our experience shows that it is unreliable, and this experience is corroborated by that of the best fruit growers in the oldest portions of Ontario. As for cow pease and soja beans, they are not equal in the colder sections for cover crop purposes to common field pease,

*Why Plants belonging to the Pea and Bean Family should be used:* A deep rooting plant, with a leafy habit of growth, owing to the necessities of the case is desirable. Also a plant that will add to the fertility of the soil when turned under. The beneficial effects of green manuring is clearly explained by the chemist of the Experimental Farms in the following language, (Report 1895, page 210):

"By the acid exuded from the rootlets, by the carbonic acid of the atmosphere, and by other means, plants are enabled to make use of much of the mineral matter of the soil. This is stored within their tissues, together with water and organic matter, the latter being derived in the gaseous form from the atmosphere, and elaborated by the leaves. The turning under of a green crop, therefore, supplies for succeeding crops a store of readily digested plant food—of potash, phosphoric acid, and nitrogen. In addition to these essential elements of fertility, the decaying organic matter from the turned-under crops acts beneficially in conserving the soil's moisture, a most important matter for light and gravelly soils. Further, the presence of this organic matter serves to regulate the soil's temperature, and its decay brings about the solution of inert forms of plant food already present.

"Buckwheat, rye and clover are the principal crops used for green manuring. Buckwheat has been found very useful, as a growth may be obtained on comparatively poor soils, soils that in the first instance would not support a growth of clover, and undoubtedly both it and winter rye when turned while green vastly improve many soils. The legumes (clover, pease, beans, etc.), however, are still more valuable, inasmuch as they not only furnish a supply of readily digestible food obtained from the soil, but add a store of nitrogen derived from the atmosphere. It is owing to this power of atmospheric nitrogen-assimilation (which takes place by the agency of certain micro organisms in the tubercles on the rootlets) that the legumes have been termed 'nitrogen collectors' in contradistinction to all other plants, which are classed as 'nitrogen consumers' The legumes appear to be richest in this element at the period of flowering, a fact which suggests this time as the best for ploughing under the crop. Since nitrogen is the most expensive of all plant foods, the knowledge of the amount of this element added to the soil per acre by manuring with clover, will prove of interest and value to our readers."

Michigan practice is: Crimson clover seeded with oats, middle of August, gives good results. Oats furnish protection for clover, help to catch snow. Rye not always turned under early enough in spring to prevent injury to trees.

The following table shows the calculated amount of leaves and stems of crimson, mammoth, common red and Alfalfa clovers per acre upon the surface of the ground just before the period of killing frosts in the autumn. The calculation is based upon the yield of a square yard of each variety.

| Plant. | Weight, green material in lbs. per acre. | Weight of roots per acre. | Per cent. of water in green material in stems of leaves. | Per cent. of dry matter in stems and leaves. | Lbs. of nitrogen per acre estimated at .5 of green material. |
|---|---|---|---|---|---|
| Crimson Clover | 22,234 | 6,201 | 83. | 17. | 111. |
| Alfalfa Clover | 11,192 | 10,587 | 72. | 28. | 56. |
| Mammoth Red | 13,310 | 7,260 | 79. | 21. | 66. |
| Common Red | 9,528 | 5,445 | 76. | 24. | 47. |

It will be seen that crimson clover gave the remarkably heavy yield of eleven tons of green material per acre. It will, however, also be noticed that the percentage of water is considerably higher in the green material of this variety than in that of any other. Calculating the nitrogen upon the basis of the total yield of green material therefore distinctly favors this variety. Among other striking points which may be noticed is the large weight of root material furnished by the Alfalfa, and the comparatively small percentage of water contained in its tissues.

There is little to be said in favor of soja beans or cow pease as cover crops for northern localities. They grow rapidly, produce a considerable amount of foliage and vine, but are cut down by the first light frosts. Apart from their office as collectors of nitrogen, they do not seem to furnish as much surface protection as buckwheat or rye, and certainly not as much as field pease.

Examining the values of the four clovers from the standpoint of the approximate amount of nitrogen returned to the soil per acre, we find by assuming that 74 pounds or two-thirds of the nitrogen in the crimson clover came from the air, at 15 cents per pound it would have a fertilizing value from this source alone of $11 20. This from the green material alone. The tops and leaves of Alfalfa would give about half that amount, but the difference would in part be made up by the relatively larger amount of root material, as well as dry matter in stems and leaves Common red clover would yield $4.65 worth, but a slightly larger amount of root material and about one-third more dry matter in the stems and leaves. Mammoth clover would stand next to the crimson clover in value of nitrogen from the leaves and stems, with $6.60 to its credit, and slightly ahead of it in quantity of dry matter.

*Alfalfa clover* is a plant of slender, upright growth and does not branch much the first season if uncut. It does not, therefore, furnish as much leafy covering to the surface of the soil as is afforded by the same number of plants of mammoth clover, which stool out better and are naturally more branching in habit of growth than the upright alfalfa. This plant does very well on sandy soils and seems able to penetrate the hardest subsoils and maintain itself where crimson clover would starve.

*Crimson clover* will, I fear, in this locality serve only one of the ends for which it is sown, viz, that of keeping down weeds and adding to the fertility of the soil without protecting it very much during the winter. It is possible that selected strains of northern bred seed may be produced that will give plants capable of withstanding the severity of our northern winter. A desirable field for patient and painstaking work presents itself in this connection. On light and poor sandy soil this variety makes a very weak growth.

*Common red*: This possesses no advantage over the mammoth red in any respect, and is a weaker grower.

*Mammoth*: I am of the opinion that this will prove the most satisfactory cover crop for all the apple and pear growing sections. It germinates promptly, soon takes and holds possession of the ground to the exclusion of weeds; is fairly deep rooted; covers the ground with a good mat of foliage in the autumn, and begins to grow at a moderately low temperature in the spring. A block of six acres of this clover, sown July 10th, in one of the apple orchards had produced an ideal protective covering when growth ceased this autumn.

Mr. PATTISON: At the request of a neighbor I sowed crimson clover on his orchard, while warning him that I considered it was sown too late. The clover failed to stand the winter; but from other experiments I have seen in the neighborhood I think that on surface soils if sown early enough the crimson clover will do fairly well. Alfalfa has not been fairly tried. I would like to ask Prof. Craig whether crimson clover would be better sown broadcast about the beginning of August in our neighborhood, or whether he would consider it better to drill it in with oats or barley or light seeding of rye?

Prof. CRAIG: If I were anxious to return as much nitrogen to the soil as possible, I should sow crimson clover just as soon as you thought it was safe to cease cultivating your orchard—say the 1st of August, and by so doing I think if the season were at all favorable in matter of moisture you would get a good strong growth in the fall and possibly you might winter the crimson clover quite successfully. On the other hand if you were not so anxious about returning nitrogen to the soil, but wished to get a general protective crop and one that would give you some humus as well as nitrogen, then I would try the oats and crimson clover combination sown later in the season. I do not think, however, it would be safe to sow it later than the 20th of August in Ontario if you expect any kind of results at all.

Mr. MORRIS: What quantity of oats would you sow?

Prof CRAIG: About a half a bushel—very light seeding.

Mr. PATTISON: You said twenty pounds I think.

Prof. CRAIG: In the case of the combination you need not sow as much crimson clover as that; twelve pounds to the acre is quite sufficient,

Mr. PATTISON: One of the difficulties in the case of an orchard that has a heavy crop is that in many cases we find it convenient to make use of horses to take that crop out. I consider that would be a very serious objection to the growth of the clover. Would there be any way to meet that?

Prof. CRAIG: That question came up at the Michigan meeting, and those who sow the oats and crimson clover combination say they get along pretty well. Of course there was a certain amount of tramping down through the orchard while the fruit was being picked, but on the whole it did not seem to kill it out very much.

Mr SHEPPARD, (Queenston): In the peach orchard we suffer severely from drouth. If we can get two or three rains just as the peaches begin to swell we get a much better crop. If we sow crimson clover the first of August we would have to cease cultivation at that time, and we would have that crop growing on the ground during the time that our peaches were at what you might call the most critical stage in regard to dampness. Now if we sow that crop would not we be taking very great risks in that respect?

Prof. CRAIG: That is a very important point. There is one way of getting over that difficulty: you can sow the crimson clover in drills far enough apart to cultivate with a narrow horse cultivator for a certain length of time, and afterwards you can sow oats between the drills and fill up—sow oats with your last cultivation, for instance. That is a practice that has been carried on considerably in the south where they fear drouths—sow the last crop such as oats or barley or something of that kind.

Mr. JONES, (Maitland): Could not a person sow buckwheat alone about the 20th August or the 1st September for a cover crop?

Prof. CRAIG: I am not very much of an admirer of buckwheat in the orchard, it gives you so little in return. It loosens up the soil and has good mechanical effect, but it does not give very much to the soil. It grows very rapidly, but it is cut down with the very first frost, and it is not equal to field peas in that respect.

Mr. JONES: It is the latest thing you can sow with success.

Prof. CRAIG: Except peas; peas will grow at lower temperatures.

Mr. SHEPPARD: The present Postmaster-General dropped a hint one day in my orchard that corn would cover the ground for the winter and would hold the snow and the frost. It occurs to me that I should have tried Mr. Mulock's hint and planted corn.

Prof. CRAIG: I do not know that it would be much better; I do not think it would be of any more value from a manurial standpoint than the rye. It perhaps might help to catch the snow more; it stands up more and offers more resistance, it has not such a smooth surface; but I do not see why it should be better than oats or even barley.

Mr. HUTT: Legumes add a great deal by what they take from the moisture, but still during the warm weather in summer a great deal of nitrogen compound is being constantly formed in the soil by the decomposition of vegetable matter. Now unless we have some crop going on there that will take up those nitrates a great part of them will be washed out by the heavy fall rains, and they will be carried off in drainage. Therefore some crop is wanted that will grow as late in the fall as possible and take up those nitrates in the roots and store it so that when they root down they will return again to the soil, and possibly in the spring, when they become decayed entirely, the trees are ready to take up those again. I think we can save a great deal even by the cereal crops—oats, rye and those things that grow late on in the season. Although they take no nitrogen from the atmosphere they save what is in the soil.

Mr. MORRIS: I think the objection to the corn will be that it will not grow greatly in the fall, and there is nothing that the frost will cut down as quickly as corn. You have to sow it in the middle of summer almost to get any growth at all that would be of use.

Mr. BURRELL: The suggestion that Prof. Craig threwout about testing crimson clover grown from the seed we plant in our own neighborhood is an excellent one, if we can thereby increase the sturdinesss of the plant. I tried it in 1895, and sowed about four acres at different seasons, from the middle of July till early in September. Although the season was very favorable and they came on very well, the plants did not develop any vigor, and it practically was a failure. This year I sowed about twenty pounds to the acre on an old strawberry bed, plowed under, harrowed over well, and sowed on July 27th, then lightly harrowed in. That clover came up very thickly and thrived from the first, and early in November it was from eight to twelve inches high and a perfect mass all over the ground, so much so that I thought it was too heavy and I was not in a position to pasture it off, so I mowed part of it off and left a piece for experiment purposes to see whether it would not suffocate out by being so very heavy, by having the top killed off in winter. I would like to ask, supposing clover is killed off in the winter, and in my case where it had grown nine or ten inches in the fall, has it not already secured a valuable amount of nitrogen even if it is killed off?

Prof. CRAIG: Certainly.

Mr. BURRELL: Then I consider, even if it is winter killed, it is an exceedingly valuable crop for us to grow.

Mr. GILDERSLEEVE (Kingston): Did Mr. Craig find that Alfalfa had any advantage over the others in withdrawing from the soil phosphoric acid and potash from the sub soil and elments? Of course the nitrogen is there to a large extent, but it gets these in addition. How does that compare with other grain crops?

Prof. CRAIG: I could not say as to figures.

Mr. GILDERSLEEVE: Would it be accounted for by the extreme depths to which its roots extend?

Prof. CRAIG: Yes.

Mr. GILDERSLEEVE: I have been told that it grows so much deeper than the roots of the trees that it brings to it those elements, and that when it is turned in the trees get the benefit which they would not have done in its natural state.

Prof. CRAIG: I think one of the chief benefits is the mechanical effect it had on the soil. Whenever a root grows there is planted a little line of humus to that rooted tube, as it were, and these so thoroughly planted all over the solid have a very beneficial effect. I found in our orchard, where the rock shale approached the surface, that it even penetrated the crevices, of that rock where the strata were perpendicular, and when I was digging up the roots I found them tightly glued into the little crevices of the rock. That is an illustration of its great penetrative power.

Mr. CASTON: Crimson clover is one of the most valuable things we can get hold of from the point of furnishing nitrogen to the soil. It is one of the most expensive elements of plant food. When you consider the area that is planted in this Province with fruit it stands to reason that without clover crop they are not properly fertilized—that the ordinary sources of manure are altogether inadequate. I would be pleased if we could get a variety of crimson clover that would prove sufficiently hardy for the different sections of this country.

Mr. HAY (Kingston): My orchard was planted about fifteen years, and since planting I have made a habit of plowing it every fall and banking my trees a certain height about the roots, but not in general. This last year I sowed common red clover about the middle of July and had a very fair crop all over my orchard. I let it remain there, and the result is that my Ben Davis trees are entirely dead, with very few exceptions—some small branches coming up in one or two trees. There were no other trees so affected, except some Grimes' Golden.

PROF. CRAIG: The Ben Davis in northern sections is a notoriously uncertain variety. I have known it to die after bearing three or four crops—being very healthy for seven, eight or nine years, then bearing two or three crops, and then when we got such a test season as last one, nearly twenty degrees below zero without any snow protection on the ground, the Ben Davis steals silently away nearly always. All through this section it is tender. The top governs the root not only as to the form of it and the way it grows, but probably the constitution.

Mr. HAY: I would say that they bore very heavy last year, and the fruit held on, and the foliage was very good. I attributed that largely to spraying. I sprayed for the first time last year, and sprayed it continually for six times I think. Through all the storms we had my Ben Davis stood better than any other.

PROF CRAIG: No doubt the heavy crop to some extent weakened the tree.

Mr. MORRIS: I am glad to see that Prof. Craig has come to the conclusion that the top has influence on the roots. We know that when the soil is very dry the frost goes down below the roots, those trees are very apt to winter kill. We notice that frequently in the case of peaches. The clover being sown in Mr. Hay's orchard may have taken out the moisture so that the frost would have more effect.

Mr. ORR: Twenty years ago, when I commenced the fruit business, it was my lot to get on a farm where the land was exhausted, and I commenced treating it with everything in sight—chips and leaves and fertilizer of every kind, from whatever source I could get it. I sowed buckwheat in the spring, plowed that under, and then sowed rye, and put everything I could back on it except the fruit, which I commenced very soon to get. I have great faith in rye. All you have to do is to show it the ground and it will grow. Let them come in contact and the rye is bound to grow. We can sow it at Fruitland up till the middle of November and have an excellent crop. The rye I took the award on in Chicago was sowed on the 14th November. We sowed it intending to plow under, but it just so happened that we let it remain, and it grew over six feet high. I would not like to sow corn in orchards to leave it, on account of the mice. They are very bad just about the foot of the mountain, where they have the run among the rocks and stones. I found I was losing considerable fertilizer from the winds sweeping off the leaves from the vineyard, and after some study I succeeded in trapping all those leaves, by running furrows down the vineyard, as soon as they fill with leaves I make another furrow, and so trap and save all the leaves to feed the land.

## REPORT OF COMMITTEE ON RESOLUTIONS

Mr. BEALL read the report of the Committee on Resolutions, and moved its adoption, seconded by Mr. A. M. SMITH.

Moved by A. M. SMITH, seconded by Thos. BEALL, "That the thanks of this Association are justly due and are hereby heartily tendered to:

"The Mayor and corporation of this city of Kingston, and to the Kingston District Society, for their kindness in providing the necessary accomodation for the transaction of its business:—

"To the Reverend Principal Grant, of Queen's University, for so ably presiding over deliberations on Thursday evening:

"To Professors Short, Fowler and Knight also from the University, and to Prof. Ruddick of the Diary School for their excellent papers and addresses given from time to during this our annual meeting, also to the local press for excellent reports, and to the Board of Governors for the use of the Building." Carried.

Kingston, 5th December, 1896.

## FRUIT AND THE TARIFF COMMISSION.

Mr. BURRELL: As most of you are aware, the tariff commissioners are going through the country to ascertain the views of the people on the tariff. The people of Hamilton have had the opportunity of appearing, and it has been thought well; that the fruit growers should officially give expression to their opinion in the matter, and I have therefore much pleasure in moving this following resolution:

Moved by Mr. BURRELL, seconded by E. D. SMITH, "That for the guidance of the committed appointed to appear before the Tariff Commission, this meeting is of opinion that the present import duties upon fruit be maintained as they are with the following changes only, viz.: the advalorem duty upon pears and plums of twenty per cent. and twenty five per cent. respectively, be changed to specific duty of one cent per pound, and that the duty upon evaporated peaches be increased to 2 cent per pound."

Mr. RACE asked that the resolution be read again, which was done, and the resolution on being put was carried unanimously.

Mr. E. D. SMITH. I have a resolution that might fairly come from this meeting, in connection with nursery stock. It is well known that at the present time the nurserymen in the northern States are being driven to the wall and ruined by the unfair competition of nurserymen from the south. If the Tariff Commissioners should take the duty off trees as they at present exist the nurserymen of Canada would be ruined in just the same way as they are in the northern States to-day. The consequence of that would be that this country would be flooded with trees grown in the south. Now, those who are conversant at all with the growing of trees will know that a tree can be grown in the south at about half the cost of what it can here. The season is twice as long, labor costs about half, and land less than half, and if they have free entry into Canada the consequence will be to ruin Canadian nurserymen as well as in the northern States, as they have done to-day. The consequence to the fruit growers would be that instead of getting northern-grown trees, hardy and suitable for this climate, they would get almost entirely southern-grown trees These would be bought by dealers and brought north by dealers who might perhaps make a pretence of growing northern trees and selling them to the farmers and fruit growers of Canada. There are a great many other reasons why this stock should be kept out, but that, I think, is a sufficient reason to induce every fruit grower of Canada to urge upon the Government to maintain a sufficient duty upon trees to enable the Canadian nurserymen to live. For that reason I beg to move the following resolution:

Moved By E. D. Smith, seconded by Murray Pettit, "That as it is extremely important to prevent the utter ruin of Canadian nurserymen by unfair competition of United States nurserymen—driven to sell their stock at a frightful loss by the enormous production of southern nurserymen; and as, in consequence of such ruin of Canadian nurserymen this country would be flooded by southern grown stock, which though firm in appearance is not at all suited for planting in this country—therefore this meeting is of the opinion that the present duties should be maintained.

Mr. Caston: What are the duties at present?

Mr. E D. Smith: The duties upon everything at present except apple, pear, plum, peach and cherry trees is twenty per cent. That is extremely low. The duty upon those trees is a specific duty of three cents each.

Mr. M. Pettit: I would second that motion, and in doing so would like to say that I have had some experience in purchasing nursery stock. Some years ago I purchased 600 peach trees, 300 of them from our own director, Mr. A. M. Smith, in the nursery, he was then conducting near Grimsby. The other 300 came from a nurseryman who represented himself as being from near Rochester. The 300 trees I bought at Grimsby were every one true to name and in good condition, and all lived. The 300 trees that came from the United States were very dry when I received them. They had just the same care and cultivation as the others. One hundred of them were not true to name, and in those trees I had a very large loss, though I cannot give you the number. Not only that, but in many of the 300 that came from the other side, the yellows broke out, and I lost my whole orchard just when it was in the prime—for in those days we did not know what the yellows were and did not commence to destroy it; and I firmly believe that it would have been money in pocket had I paid Mr. A. M. Smith $5 apiece for another 300 trees instead of getting those 300 as I did from the other side. I have had other similar experiences, which it is not necessary to take up the time of this Association in discussing, and I believe it is in the interests of the fruit growers of this Province that the duty remains to encourage our home grown trees, which we all know are truer to name and are better suited to our climate.

Mr. Caston: In speaking of southern-grown trees do you mean from the southern States or from Rochester?

Mr. E. D. Smith: Southern States; such as Georgia and Alabama.

Mr. Caston: Would you include Ohio?

Mr. Smith: Southern Ohio would be pretty tender. Northern Ohio would be all right.

Mr. Pattison: I would like to say a word in support of this motion. From my view of over-planting I think that this duty should decidedly be kept as it is now.

Mr. Pettit: Raise it.

Mr. Pattison: We are suffering at the present moment sufficient from the amount of trees we are induced to plant by the home nurserymen. (Laughter). I think that fruit growers have suffered very badly from varieties not being true to name, and from countless other causes; but if any rogue be encouraged at all I think it is better to encourage the home rogue than the foreign rogue—(laughter)—and on those grounds I would have much pleasure in supporting this resolution.

The motion was then put and carried unanimously.

The convention closed at 12.15 p.m.

In the afternoon the delegates were driven to the Rockwood Asylum and the Provincial Penitentiary, the workings of which institutions they inspected with interest.

The Anderson Force Pump of Aylmer, Ont., and the Soramotor of London, Ont., were on exhibition in the hall of the Dairy School during the sessions of the convention.

## FRUIT AS FOOD AND MEDICINE.

By Rev. George Bell, Queen's University, Kingston.

The Fruit Growers' Association is doing much to awaken the people of Ontario to the importance of the cultivation, production and improvement of fruit, and to its value both in domestic economy, and as a factor in commercial and national wealth. By many, fruit is looked upon as a luxury, and little as an integral part of daily food, still less as a continually needed medicine. But for both food and medicine, fruit is important everywhere, and peculiarly so in this Province, first from the necessity of its use, and secondly from the comparative ease with which it can be obtained. The climate of Ontario is often spoken of as glorious, and justly so; but yet it has some peculiarities which require attention if we are to enjoy a full measure of health. The sudden changes of temperature, the rapid growth and decay of vegetation, and many consequences of the opening up and settling of a new country produce results, malarial or otherwise, which need to be guarded against. This requires attention both to a properly regulated diet and to the surrounding influences of heat, cold, dampness, purity or impurity of air, etc. While foods consist mainly of two classes of substances—flesh-forming, as meat, cheese, gluten, etc; and heat-producing, as grains, roots, etc., having starch and sugar as constituents for perfect development and health of the human body, these are not sufficient. There have to be added substances of varied chemical composition, both to aid the assimilation of the food and to eliminate injurious substances. One series of derangements arises from influences, malarial and otherwise, which may act injuriously, either organically or functionally on the liver or alimentary canal, producing enteric effects of a serious nature, or congestions of various kinds. These congestions are commonly spoken of as colds, or a person is said to have taken a bad cold. I am not aware that any cold, so called, is a good one, but I am convinced that cold is not the cause of any such ailment. When the system is developing such an ailment, exposure to cold may determine the particular kind of congestion produced, or the organ chiefly affected, being thus an incidental influence, but not, in any proper sense, the cause of the disease. The cause seems to be a deteriorated state of the blood, arising in most cases from defective alimentation, from the use of food of difficult digestion or unhealthy nature. The result will naturally be a supply to the blood of unhealthy nutriment, followed by injurious results to the heart, lungs, liver and kidneys, and congestions of the weaker parts of the system. Another series of complaints arises from the depositing in the tissues of calculous or other mineral substances, generally urates of various kinds. In hot weather animal food sometimes develops forms of alkaloids which are highly poisonous, known as ptomaines. From this cause canned meats are sometimes found to be poisonous without apparent cause. Now the same process may take place in the intestines, giving rise to diarrhœa, dysentery, and other dangerous affections. For all these classes of complaints nature has furnished a preventative and a cure in fruit. Ripe fruit is in such cases a corrective and also an opportune article of food.

Sweet fruits, such as bananas, are important additions to our list of foods, but are less important in a sanitary view than fruits containing acids. We may notice incidentally the general value of oranges for indigestion, and lemons and tamarinds in fevers, but these cannot be so important to us as native fruits, as they can never fill the place of these, and cannot be so generally used. To be generally useful to the whole people of this Province, or of the Dominion, fruits must be easily accessible in all localities, and sufficiently cheap to be obtainable by all. Peaches are a most valuable fruit, but from their limited area of production and perishable nature, they can only be a luxury to most of our people. Practically apples and grapes must be our great dependence for most of the year, with cherries and berries to fill the season, when the others are not obtainable. For a large part of Ontario apples, grapes, plums, cherries and berries will practically fill the year.

Ripe fruit is highly valuable as an article of diet. While a large part of its bulk is water, it contains most valuable elements of nutrition. The required albuminous and nitrogenous compounds essential to the fullest alimentation and health of the human

body are there provided. As nature shows by the growth of infants that the mother's milk is the most complete combination of food elements, it is interesting to notice that grape juice is almost identical in its nutritive elements, though with an addition of acids and their chemical combinations. It has therefore been suggested to substitute bread or other farinaceous substances and grape juice for bread and milk as a part of infants' and young children's food. I have no doubt that this is a valuable suggestion, especially in warm weather.

As most of these fruits contain a considerable amount of acids, malic, tartaric, citric, etc., this may appear an objection on the score of health. But these acids are combined with alkaline bases, which fact materially changes their action. One of the most common of these is potassium, which in these combinations is very efficient in eliminating noxious matter from the system. Thus tomatoes are of much value in liver, kidney and gastric complaints. Apples, besides malate of potassium, lime and other salts, contain phosphorous in sufficient quantity to act as a restorative to the brain and nerves; even sour apples will reduce a tendency to acidity in the stomach. Baked apples form one of the most agreeable, digestible and healthy items of food we possess. The writer has used them ordinarily at both the morning and evening meal for ten or eleven months of the year for many years, and he is convinced that this practice has been an important factor in the good health enjoyed in old age, better than he had thirty or forty years ago. The usefulness of the apple, no doubt, gave rise to the old Scandinavian idea that apples constituted the food of the gods: although we suppose that these old time gods did not have Rhode Island Greenings, Kings or Spies; nor, as the Fruit Growers' Association and Linus Woolver on had not yet arrived, the Princess Louise. At the season when apples become scarce, strawberries come in and supply one of the most valuable, perhaps the most valuable of all fruits in a medicinal point of view. Other berries follow and keep up a supply until apples again come in. The use of fruit is important in fevers, indigestion, liver complaints, rheumatism and gout. The grape cure is largely resorted to in France and Germany, where patients consume grapes beginning with a pound or two daily, and increasing to six pounds and in some instances to twelve pounds a day. Such treatment is beneficial in two ways: both for dissolving calculous deposits, and for washing out the tissues. As a general summing up, fruit may be described as beautiful (to the sight), delicious (to the taste), odorous (to the sense of smell), and healthful (to the body). In an old number of the "Horticulturist," September, 1880, Mr. A. Hood, Barrie, relates some remarkable cures of chronic diarrhœa and piles from the use of fruit, especially strawberries; and also of the cure of weakness and pain in the eyes by means of cream tartar; and he suggests the use of grapes for complaints of the eyes, as they contain a considerable quantity of this chemical. A medical opinion or two may here be in place. One doctor has said that farmers have no need for doctors when fruit is freely used. Another says: "Nothing does more to rid us of patients than the daily use of fruit. It clears the organs of every impurity." Certainly we have no ill will to the gentlemen of the medical profession, but in the general struggle for existence it will be better to invest money in apples or grapes than in doctors' bills.

For breakfast it would be much better for the general health of the community, if animal food were abolished, and, along with grain foods, to use fresh fruit when obtainable, or baked apples. For a light meal or lunch, Graham bread and fruit will be found satisfactory. For school children's lunch many articles are used, some of them very queer. Some of their baskets are supplied with pie, consisting principally of a sodden mass of combined grease and flour, and sometimes with villainous pickles as a relish. I understand that in England a common practice is to put in the child's lunch basket bread and cheese, and an apple. This is surely more rational, as well as being free from the charge of cruelty to children. The athletes of Greece are said to have been fed on figs, nuts, cheese and bread; the Moorish porters on brown bread and grapes.

While fresh fruits should be freely used when obtainable, there are many prepared sorts which may be useful, when the fresh form cannot be had. Grape juice may be prepared by heating to the boiling point and bottling hot, either sweetened or not. It should

not be allowed to boil, if the fine flavour is to be retained, and it should be kept in a dark place. Condensed must, or juice evaporated to the consistency of a syrup, and catsup or sauce, which may be spiced in various ways, are found worthy of trial. The ordinary mode of canning fruit is familiar to all. For this purpose glass jars are much better than tin cans. The old-fashioned apple butter, the manufacture of which, I fear, is becoming a lost art, should have its use revived. A variation of this may be suggested, in the cooking of apples with grape or other fruit juice, instead of cider.

Although not immediately connected with the subject of this paper, it may be mentioned that fruit is a valuable food for stock. Apples have been tried successfully with horses, keeping them in a healthy and vigorous condition; also with cows and young cattle. It has been found that the quality of butter has been much improved by supplying the cows with apples as part of their daily food. This may be a matter of importance to farmers, when they shall be induced to raise apples in large quantities.

What lessons then are we to learn from the foregoing? Certainly this, that every farmer should engage largely in the raising of fruit; and that every one who cultivates a garden should make fruit growing a leading interest. I am aware that the situation about Kingston is unfavourable. The soil is hard and cold, and the climate is not like that west and south of Hamilton. The ground needs a kind and amount of preparation which will involve an amount of expense and work beyond the requirements of more favourable localities. Still I am convinced that the results to be reasonably hoped for will justify the expense. I have sometimes been told that a farmer can buy fruit more cheaply than he can raise it. I fear that there is a misapprehension here. A farmer may annually drive into a city and buy a large supply of apples, for example, for a number of years at less expense than he can plant and care for an orchard; but this covers only part of the question. He cannot go daily in summer to a market for a supply of the small fruits which are essential for the health of himself and his family. And the cost of the orchard, which at first yielded no return, will diminish, while its returns will be increasing. No constant supply of fruit for the whole year can be satisfactorily provided in any other way than by home production for the bulk of it. Without actual experience no one can understand either the quantity and variety of fruits which can be grown on a comparatively small area of land, or the satisfaction and enjoyment derived from tending them, and watching their progress. As an encouragement for amateurs, I may mention my experience at Niagara Falls on about half an acre of hard clay soil on the Niagara limestone. There were several bearing apple trees already on the ground, and the only apple tree I planted was a large crab (Montreal Beauty). I had part of the ground trenched two spades deep, and well manured at first, and annually cultivated and manured afterwards. I planted and succeeded fairly well with most of the following varieties: 15 dwarf pears, 4 plum, 4 peach (on plum stocks), 3 cherry, 1 apricot, 10 grape, 3 currant, 4 gooseberry, 7 raspberry, 1 blackberry, 2 strawberry. Besides these, from want of knowledge at the time, I attempted to grow European grapes in the open air, which entirely failed. By experience I learned that some sorts were not so suitable as others. For example, the red Antwerp raspberry produced delicious fruit, but the canes suffered in winter, and were so large and brittle that they could not be laid down for protection. The new Rochelle blackberry, which was vigorous and healthy for two or three years, afterwards appeared to be tender.

To stick trees or plants into a hard soil as if they were stakes, and then leave them to grow or die as may happen, will not be successful; but with the selection of suitable varieties, proper preparation of soil, cultivation and care, I believe that fruit growing will be both enjoyable and profitable in any part of Ontario. But the local conditions vary so much that extensive experimenting will be necessary in order to cultivate varieties adapted to these conditions. I would advise every one who can control any amount of land, large or small, if not already a member of the Fruit Growers' Association, to become one without delay; to study carefully its researches, and to become an experimenter himself, so as to be able to decide intelligently on varieties adapted to local circumstances, and to assist in extending the area and the quantity of fruit grown throughout our country.

## SOME CAUSES OF FAILURE IN APPLE CULTURE.

By L. Woolverton, Secretary, Grimsby.

Property cared for, the apple orchard is, comparatively speaking, one of the most valuable portions of the farm, even if it is only large enough for home uses. Situated as some farmers are, at a long distance from a railway station, or a good market, the expenses of teaming the crop might make the odds against growing a commercial orchard, but otherwise, taking one year with another, I believe the apple crop can be made to pay twice as well, acre for acre, as a grain crop, all things considered.

I am aware that I am courting opposition on this point, and grant that facts, in many instances, are against me. Even in the Niagara district, in the very centre of fruit culture, in the very best of soil and location, apple orchards just in their prime, beautiful, thrifty trees of the best varieties, are being mercilessly cut down and sacrificed on each side of me. The owners declare that they are unprofitable. They say that the trees will not bear, that the apples of late are smaller than they used to be, that the worms destroy the most of them, and that the small proportion remaining for the owner to harvest bring no price in the markets. They have therefore resolved to cut down their orchards, and dig them out by the roots, in order to devote their ground to the growing of grain and root crops, which they claim will pay them better.

I grant them honesty in their statements; I myself have observed the unproductiveness of the orchards, which are no doubt duplicated in every part of Ontario, and I venture to say that one of all of the following causes will explain the unfortunate conditions of affairs.

### 1. The Location of the Orchard.

A common notion is that any place will answer for the apple trees, and therefore very often a stoney corner that cannot be worked, or a very heavy clay which one does not want to work up, is set out to an apple orchard. That such an orchard would never be a success goes without proving.

But a more common fault for the location is a wet soil left without underdraining. Trees in such situations may grow well in summer, but are almost sure to become winter killed, or at least so injured by the cold in winter that they become enfeebled and unproductive. The remedy is plain. A thorough system of underdraining is of the first importance.

Another evil of the situation is exposure to high winds. Those who have had almost their whole crop strewed upon the ground in the autumn by wind storms know how to appreciate the favoring protection of a dense woods of deciduous and evergreen trees. This cannot be quickly remedied, but a windbreak of a double row of Norway spruce trees will, in twenty years, be of inestimate value in this respect.

### 2. Lack of Cultivation.

The second cause of failure, one of the most common, is lack of cultivation. Some how or other the idea has got abroad that the apple orchard needs no cultivation. True, there is no growth of wood, the fruit is small, and imperfect of its kind, but it never seems to occur to the owner that the trees would grow any better for being cultivated; or if he does believe in it, he does not sufficiently value his apple crop to give it the same attention as he would his corn or potatoes. There is need of a general waking up in question. I must confess to having been once of this opinion myself, but I have been converted. I have found that where the orchard is in an unthrifty condition, so that the leaves are of a light green or yellowish tint and ripen early, and the fruit is scant and poor, cultivation is the surest and speediest cure, and will accomplish what pruning and manure will utterly fail in doing without it. Cultivation of the soil so exposes it to the action of the air as to make available the plant food which is already there in store, and besides, has a most important influence in counteracting the serious drouths to which our country is of late so subject.

One of my orchards which had been planted some twenty-five years was in the condition above described. It had been left seeded down for about ten years, and had become unthrifty and unfruitful. In the summer of 1886 I broke up thoroughly one-half of it, applied wood ashes and pruned it carefully, while the other half was pruned and manured, but not cultivated. The same treatment was continued during 1887, and the result was plain enough to the most casual observer. The cultivated portion resisted the drouth of that year completely. Its dark green foliage was a remarkable contrast to the light sickly green of the other part, and, more important still, the cultivated trees are laden to the very ground with such a load of fine Baldwins, Greenings and Golden Russets, as cannot be equalled by any other orchard on my fruit farm.

### 3. Lack of Manure.

Who ever thinks of giving his apple orchard an annual dressing of manure? All the manure is put on the field crops; no farmer would think of growing fine potatoes or a paying crop of grain without a heavy coat of manure, but the apple orchard must shift for itself, without either cultivation or manure, and then if it does not yield a paying crop it is condemned as worthless, and ought to be cut down because it does not pay. Is it the fault of the orchard or of the orchardist? Why should it be expected to do what no other farm crop could possibly? Why, the farm was perhaps cropped for years before the orchard was planted, and the fertility of the soil well nigh exhausted: trees have been drawing on the soil for years, and now are blamed for unproductiveness. Is this reasonsonable, I ask?

But says one, "I cannot spare the manure from my other crops." Very well. You must put it where it will pay best, but I claim that place is the orchard.

I find that farmers generally in Canada quite under estimate one of the most valuable of orchard fertilizers, and either let it waste or sell it for a mere song. I refer to our wood ashes, which are so undervalued in Canada that Canada ashes have become an article of export to enrich the fruit farms of our Yankee neighbors who purchase them by the car load.

The following is an advertisement clipped from an American paper:—"Canada Hardwood Unleached Ashes, by rail in carload lots furnished on short notice. Ashes guaranteed to be of best quality, and are especially adapted for all grass and fruits. Pamphlets and prices sent on application, Munroe, Judson & Stroup, Oswego, N.Y." This is only one of many. Such quantities have been imported from Canada into the United States that a special bulletin has been published by the Connecticut State Experimental Station, showing the analysis of the various brands. The market value is twenty-five cents a bushel, although their real value is much higher.

The following table shows the value of wood ashes compared with stable manure and with a commercial fertilizer which we may call a complete manure:

#### Comparative Value of Wood Ashes.

In 1,000 pounds of wood ashes there are, say,

| | |
|---|---|
| 60 lbs. of potash at 7 cents per lb | $4 20 |
| 20 lbs. of phosphoric acid at 5 cents | 1 00 |
| 700 lbs. of carbonate of lime | 5 20 |

About one-half cent per pound. The remainder consists of magnesia, insoluable matter and moisture.

One bushel weighs about sixty pounds and is, therefore, worth from 30c. to 60c.

In 1,000 pounds of complete manure there are:

| | |
|---|---|
| 70 lbs. nitrogen at 20 cents | $14 00 |
| 30 " potash at 7 cents | 2 10 |
| 60 " phosphoric acid at 5 cents | 3 00 |
| | $19 10 |

Or nearly two cents a pound.

In 1,000 pounds of stable manure there are :

| | |
|---|---|
| 5 lbs. nitrogen at 20 cents | $1 00 |
| 6 " potash at 7 cents | 42 |
| 2½ " phosphoric acid at 5 cents | 12 |
| | $1 54 |

Or one-seventh cent a pound.

Leached and unleached Canada ashes have approximately the following percentage composition :

| | Unleached ashes. | Leached ashes. |
|---|---|---|
| Sand, earth and charcoal | 13.0 | 13.0 |
| Moisture | 12.0 | 30.0 |
| Carbonate with some hydrate of lime | 61.0 | 51.0 |
| Potash (chiefly as carbonate) | 5.5 | 1.1 |
| Phosphoric acid | 1.9 | 1.4 |
| Other matters by difference | 6.6 | 3.5 |
| | 100.0 | 100.0 |

It appears from this statement that more than half the weight of both leached and unleached ashes consists of lime, partly as hydrate but chiefly as carbonate ; the same material chemically as chalk or limestone, but finer and so likely to be quicker in its action.

Now, potash is a most important fertilizer for the orchard. (1) it promotes growth, (2) it improves the flavor of the fruit by causing an increase of sugar and a decreasing of acid, (3) it improves the color of the fruit, and this is very important in apples intended for the market. Apples draw heavily on the soil, and especially upon this element. It has been stated on very good authority that 100 barrels of apples draw more heavily on the soil than a crop of fifty bushels of wheat.

By reference to a table showing the constituents of the apple, the reason will be obvious.

### Analysis of the Apple Constituents.

1-1000 parts of apple contains :

| | | | |
|---|---|---|---|
| Water | 831. | Lime | .1 |
| Nitrogen | .03 | Magnesia | .2 |
| Ash | 2.2 | Phosphoric acid | .3 |
| Potash | .8 | Sulphuric acid | .1 |
| Soda | .6 | Silicic acid | .1 |

From all this it is evident that two of the most important elements, as potash and phosphoric acid, are supplied in wood ashes.

With regard to the action of ashes upon the soil, it is important to notice that a heavy application of unleached wood ashes to a heavy soil is damaging to its texture, rendering it heavier still, more tenacious, and inclined to be cloddy. But for this reason its action on light soils is highly beneficial, rendering it more compact, filling up the pores and keeping it moist. It also tends to correct "sourness" in the soil by precipitating the soluble iron salts which are sometimes over abundant.

Another benefit is that it promotes nitrification, or the process by which nitrogenous matters in the soil are rendered available for the tree growth. It is thus evident that ashes have more value than simply for the amount of potash and phosphoric acid they contain, on account of their mechanical action, especially for light soils.

I have a hundred acres in orchard, and was almost in despair about fertilizing it properly, until I found I could buy ashes from farmers all about me for a mere song, and as much as I wanted. And now every winter I keep my team engaged collecting ashes for miles around and apply it to my orchard. The results are evident—apples in abundance and of such a size as astonished those who saw them ; Baldwins are often as large as Kings.

My soil is chiefly a sandy loam, and consequently of just the character to be most benefited by wood ashes.

The quantity applied is about one-half to one ton per acre, or about one-half a bushel to a bushel per tree.

### 5. The Ravages of Insects.

The ravages of insects is no less important a factor in producing failure in apple growing for profit than the others I have mentioned. The man who neglects to spray his apple orchard in June with Paris green must expect his crop to be thinned out one-half by the Codling moth in September.

Some people even yet need to be convinced of the importance of this, but those who have given it careful trial agree in its benefits. I have tried spraying for the Codling moth for ten successive years, and where carefully done, and repeated if washed by rains, I have found a great saving of my apples and a general improvement in their quality.

Few of us growers are exact enough with our experiments to say precisely what proportion of the crop is saved by spraying. A careful experiment was made on one occasion at the Geneva Experiment Station, N.Y. The trees were mostly Fall Pippins, and every alternate tree was treated twice in the month of June, first about the 3rd, and then again about the middle. The total number of apples was carefully counted, also the total number of sound and of wormy apples, and the percentage of wormy apples was carefully estimated for both sets of trees. The result showed 13 per cent. of wormy apples on the sprayed trees and 35 per cent. of those not sprayed. This would amount to twenty-two barrels out of a hundred saved by spraying, and estimating the value at $1 per barrel, the gain would be somewhere about $22 per acre of orchard.

Judging from my own experience I do not believe that this estimate is too high.

While packing my apples and pears last season I was more than ever convinced of the great benefit of spraying with Paris green. In some portions inaccessible to the waggon, this treatment was neglected, and as a result, an immense crop of codling moths was harvested, and innumerable apples wasted; while those trees carefully treated were almost free from this mischief-maker. And that is not the only benefit; indeed, quite as important is the perfection of form of the sprayed fruit. A Duchess apple tree always bore knotty fruit previously, but since being treated to Paris green its fruit has been perfect.

The codling moth also attacks the pear, and therefore the pear orchard should also be sprayed in the same way as the apple for its destruction. The Bartlett pear is especially subject to produce knotty specimens, due to the work of the curculio, and other insects. Indeed, fully half the crop has to be thrown out for seconds on this account. But for two seasons now, I have sprayed them carefully, and as a result, have had comparatively few knotty pears. The editor of *The Country Gentleman*, in a recent number, gives his experience in spraying Bartlett pears, and it corresponds with my own as given above. I copy from the journal outlines of two specimens, showing the effect of the treatment as described above, but with us the disfigurement has averaged greater than is here represented.

But the advantages of spraying for insect pests having been once proved it did not take long to find that it was of almost universal application. Our experiment stations soon discovered the benefit of copper sulphate for destroying fungi and of kerosene emulsion for such insects as did not eat the foliage but only sucked their nourishment from the leaves. These discoveries are creating a revolution in fruit growing and making possible the highest success for those fruit growers who will use to the best advantage the prescribed remedies. I will read a few lines by Prof. Bailey, of Cornell, on spraying trees, on this point; he says, spraying is of some value every year on apples, pears, plums and quinces. Nearly all the sprayed orchards are carrying a better foliage than those which are untreated, and where the codling moth, bud-moth, case-bearer and other insects are plenty, it has been of decided benefit. So, wholly aside from the idea of insuring against risk, it is advisible to spray for those insects which are

more or less abundant every year. Some insects and diseases appear late in the season, so that the spray may be needed at some epoch in the season.

Spray thoroughly, or not at all. I should say that fully half the spraying which I have seen in western New York in the last two or three years is a waste of time and material. Squirting a few quarts of water at a tree as you hurry past it, is not spraying. A tree is thoroughly and honestly sprayed when it is wet all over, on all the branches and on both sides of all the leaves. An insect or a fungus is not killed until the poison is placed were the pest is. Bugs do not search for the poison, in order that they may accomodate the orchardist by committing suicide. The one spot which is not sprayed may be the

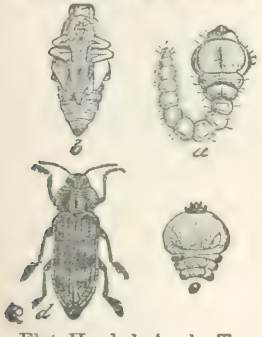
Sprayed Bartlett, $\frac{2}{3}$ of natural diameter.

Unsprayed Bartlett, $\frac{2}{3}$ of natural diameter.

very place where a bud-moth is getting his dinner. On the other hand, there are many fruit growers who spray with the greatest thoroughness and accuracy, and they are the ones who, in the long run, will get the fruit.

Prof. Panton, of the O. A. C., Guelph, has issued a most convenient spraying calendar which every fruit grower should have, and which may be had on application to the Department of Agriculture, Toronto. He has also published a small book on "Insect Foes and How to Destroy them."

The *Flatheaded Apple tree Borer* is a most formidable enemy to the apple orchard. The months of June and July are the season when the parent beetle is most active in her search for a favorable place under the scaly bark, or in the crevices of the trunks of the apple trees. When an orchard is growing vigorously the young larva seems to be outwitted by the rapid growth of the wood, but when an orchard is grass bound and growing very slowly, the trees are almost sure to suffer, and oftentimes, if neglected, will be wholly destroyed.



Flat Headed Apple Tree Borer, *Chrysobothris femorata* Fabr: *a*, larva; *b*, beetle.

The beetle is about half an inch long, of a shinning greenish black above, and like burnished copper underneath, and will be readily recognized from the engraving. It is said to sometimes attack the pear and plum trees, but we have never been troubled with it except in our apple trees, where it was trouble enough until we knew how to fight against it. The presence of the larva may be detected by the rough, dark, and sometimes cracked state of the bark, usually on the north or northwest side of the trunk, or by the fine chips which

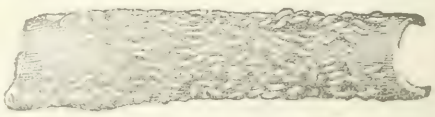
they exude from their holes when quite young. A sharp pointed knife will soon discover the hateful intruder, which will be at once seen to be truthfully represented in fig. —*b*, with its great flat head, which is altogether out of proportion to its body. Washing the trunks of the trees at this season with some alkaline solution is the easiest way of saving our orchards from this borer, as for instance with soft soap reduced with a solution of washing soda and water, the latter in the proportion of a quarter of a pound to a gallon.

Another formula is—Take one quart of soft soap boiled in two gallons of water, and while hot stir in one pint of Carbolic acid.

The *Oyster Shell Barklouse* is insignificant in size, but terrible by reason of its numbers.

Very few have any idea how common a pest this is in our Canadian orchards. Many people are wondering why their orchards are so unfruitful, and why they are so stunted in growth, and look so sickly, when the whole trouble is due to this pernicious little louse, which, unnoticed by them, is preying upon the bark of their apple trees in immense numbers, sucking out their strength and life.

Last summer toward the end of May a neighbor brought in to the writer a branch of a young tree from his orchard asking, "What is the matter with this tree?" The tree would not grow, and he had discovered that the bark was curiously rough with numerous tiny scales about one-sixth of an inch in length, as shewn in fig. 1. Upon lifting one of these scales and using a hand glass the question was soon solved. To his astonishment, there were revealed nearly one hundred wee little lice, too small to be readily seen by the naked eye, and which ran about with the greatest speed over the bark as if delighted at their liberation from the confinement of the maternal shell. No wonder the tree was stunted!



Oyster Shell Bark Louse.

This louse belongs to the genus *Coccidae*, and is allied to the aphis, bed bug, and body-louse. It was introduced into this country some eighty years ago from Europe, and although the female cannot fly, and hence migrates slowly, it has now become more or less distributed throughout our whole country.

The time to destroy these bark lice is early in the month of June, because at that time the young brood escape from under the scales where they hybernate, and which are actually the dead bodies of the mother lice. The loose bark should first be scraped off with a hoe, because the cunning youngsters hide away carefully beneath it, as if they were trying to escape discovery.

Then the trunks and large limbs must be washed with a strong solution of soft soap and washing soda, with enough water to enable one to apply it with a paint brush, or scrubbing brush. If the lice have spread over the limbs, the whole tree must be sprayed with a solution of washing soda and water in the proportion of half a pound to a pailful, or potash and water, two pounds to seven quarts. Caustic soda and water is recommended as still more effective.

There are several insects which prey upon the bark louse, as also some insectivorous birds, but unfortunately this hateful insect increases out of all proportion to the number of its destroyers, and unless vigorous remedial measures are employed, some of our best orchards will die of premature old age.

### 6. Bad Harvesting.

Even presuming that the orchard has been properly cultivated, pruned and enriched, there are many who yet fail to handle the fruit to the best advantage. In the first place, it is a common mistake to leave the fruit hanging too long on the trees before picking, and in consequence they become too ripe to keep well, and a large pro-

portion is spoiled by falling to the ground. My experience has led me to begin gathering much earlier than formerly, and indeed before my neighbors seem to think of it. At one time it was my rule to begin gathering them about the 9th of October, but the high winds of that month made such havoc with them that I soon changed that rule. The 20th of September is none too soon to begin with such kinds as have attained full size and color, and if by that time all the apples upon a tree have not reached maturity, it will pay to make two pickings, leaving the greener and smaller ones to grow and color up. Attention to the details of preparing fruit for market always returns a good profit and must not be grudged. Careful handling and careful sorting are of paramount importance. Many throw apples into the basket as if they were potatoes, or squeeze them with thumb and finger as if they were made of stone, and so leave marks which spoil their beauty. Round swing-handle baskets, attached with a wire hook to the rounds of the ladders, are the best for apple packing.

Most orchardists empty their apples in piles upon the ground, but sorting in that case is back-breaking work, and every rain delays it. Some empty them in heaps upon the barn floor, but in a large orchard this means much labor in carting. My custom has been to empty into barrels in the orchard, the heads of which are left in the bottom, and store under cover; and then in packing empty them out on a packing table for sorting. For young orchards and scattered varieties this is the best plan I know of, for the important work of packing can then be done in a clean, dry place without moving about with nails and mallets and press from one part of the orchard to another.

Many inquiries are received concerning the best plan for a farmer to dispose of his marketable apples—whether he should sell them at home or ship to a foreign market. Well, if he has a very large orchard, so that he can ship by the carload, or if he has small lots of one special kind, such as the Gravenstein or King, I would say ship to some reliable English wholesale house. As I can show from my account sales my Gravensteins and Kings, in some ordinary seasons, have sold in Covent Garden Market, London, England, as high as $6 per barrel, which I consider paid me very well. Of course these apples were extra selected, all No. 1 grade, and highly colored.

But with mixed lots, less than carloads, it is better to take $1, or even 75 cents per barrel for the fruit at home, than risk a possible loss by shipping so far.

But at even $1 a barrel, I ask what farm crop pays better. Take for example an acre planted entirely with Baldwins and Greenings, and what will it pay you at those prices? Suppose you only get 100 barrels a year on an average from it, what other crop would give you $75 or $100 per acre with less labor.

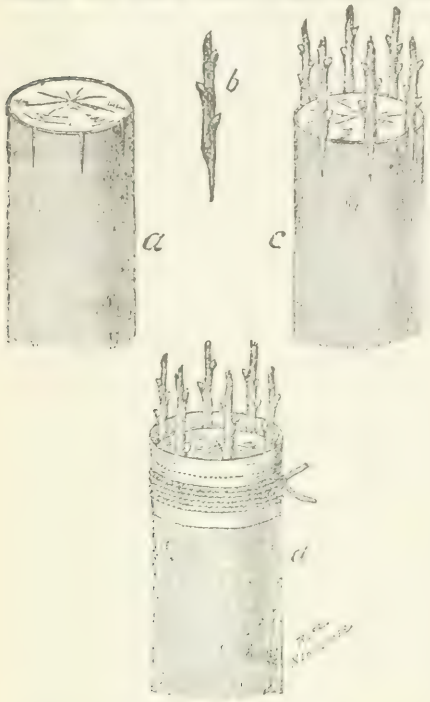
Of course it is expensive work planting and raising an apple orchard, a heavy investment; but I am not urging the planting of new orchards so much as the better care of those we have.

### 7. Poor Varieties.

Perhaps you have not the most profitable kinds; then top graft and you will soon have those varieties which are proved most desirable. The work is not difficult or mysterious, but quite practicable by anyone who can handle his knife skilfully; but for old trees a method known as crown grafting is very well adapted, as figured in a recent number of *The Rural New Yorker*, and by favor of the editor we are enabled to give our readers the following description of it with an excellent illustration:

"The following is an easy and effective method of grafting old trees. By it the percentage of failure is reduced to a minimum, and branches at least six inches in diameter, and, in the case of pear trees seventy-five years old, may be worked with assured success. Last year we mentioned the case of such a pear having been grafted two years before with the Kieffer, that gave a full crop last fall. Saw off the branch at right angles to the stem to be grafted as at Fig. ——*a*. Then cut a clean slit in the bark through to the

wood, as shown—a slit the same as in budding. Separate the bark from the wood and insert the cion *b*, one for each slit. The number of slits for each stock will be determined by its size. We will suppose the stock illustrated to be six inches in diameter, and that six cions are to be inserted. The stock after receiving the six cions is shown at *c*. Grafting wax is not needed. A thick paper may be wound about the top of the stock extending about one inch above it and securely tied with a strong twine, as shown at *d*. The space above the stock encircled by the inch of paper may then be filled to the top of the paper with a puddle of soil and water, made so thin that it can be readily poured from any suitable vessel. This mud protects the surface of the wood of the stock, and excludes the air from the insertions. It gives every advantage of wax without its objections. Of course, stocks of any size may be worked in this way. One, two, or any number of cions may be inserted according to the size of the stock.



Cut of Crown Grafting.

I have now given an outline of the chief causes of failure in apple growing in Ontario, and at the same time indicated how they may be overcome. I believe in the future of apple growing in Ontario, for we can grow the finest apples in the world, and our fruit is wanted. Let us grow it in that perfection to which our soil and climate so well adapts our Province, and then establish a reputation for first-class honest packages of selected high-grade fruit, and our fruit growers will be the most successful class of people in Canada.

## PEAR GROWING.

By R. L. Huggard, Whitby.

The pear was a very common fruit many centuries ago. In the earliest records of the Roman nation pears were an article of commerce, and were quite common in Syria, Italy and Greece. Theophrastus speaks of the productiveness of the old pear trees, and Pliny describes the varieties as exceedingly numerous, and names many varieties, but the same authority aptly remarks, that all pears whatsoever, are but a heavy meat unless they are well boiled or baked, therefore we may fairly conclude these ancients did not have any of the Bartlets or Seckels of the present day.

In planting a pear orchard there are a few very important things to be considered: (1) The location should be (in this country) on a southern or western slope, if possible, and not on a northern or north-eastern exposure, for most varieties. (2) The soil. The best soil to grow pears on is a pretty heavy clay loam, or a loamy top with a good clay sub soil, and as the average pear is a strong, rampant grower, a strong clay sub soil is of great importance, but the land should be thoroughly underdrained for a pear orchard as well as for any other orchard. (3) In planting, I prefer two year old trees in free growers, and three year old from the bud, for the slower growing varieties, such as Lawrence, Beurre d' Anjou, Tres Druard and others. The land should be well worked one year at least before planting, and the holes for the trees considerably larger than what is neces-

sary to receive the roots. When planting, I always prune the roots, first cutting back to the sound wood, then set the tree in place, throw in a few shovels of loose top soil, shake the tree up and down a few times, then add a few more shovels of earth till the roots are covered, then tramp all very solid. This is just where many planters make a serious mistake in not packing the earth firmly enough when planting. If planting in spring, the pruning should be done as soon as planted and every branch should be cut away except two or three at most, and these should be cut back to a few buds of the last year's growth. Some people seem to think that when they get their trees into the ground that their work is done and in a year or two every tree should be loaded with luscious fruit, and if not, that unscrupulous agent has cheated them. They never take into account the number of hours, or even days, the trees were lying in the driving barn or woodshed before planting; or if planted immediately, the work was left to the hired man or the boys, who perhaps never helped to plant a tree of any kind. I have known many instances where a few trees were purchased for garden planting, and the ladies had to do the planting themselves or it would not have been done till all the trees would have been dried up. In a young orchard the land should be regularly kept cultivated; I usually plant a crop of corn the first year, this serves a double purpose. First, it gives the cultivation necessary to get a good crop of corn, requires thorough stirring of the ground, and second, the corn protects or shades the young trees from the sun during the hot summer. We, in Ontario, usually have held, I believe, that the ground in all young orchards should be kept cultivated for at least the first seven or eight years. Hoe crops can be grown without injury to the trees for several years after planting, provided that the land receives a good coating of manure each alternate year. The young pear trees should be kept well pruned till they get into full bearing, after which they require very little pruning of any kind.

I do not propose to speak very dogmatical on varieties, but there are certainly some kinds more hardy than others, some of which I would not be afraid to plant in suitable soil in the county of Frontenac, such as Bartlett, Beurre d'Anjou, Lawrence, Keiffer and Seckel, and make money out of them; but there are others I have tested that I would plant sparingly, viz.: Clapp's Favorite, Howell, Flemish Beauty, and some others that grow very rapidly, but do not always ripen their wood, the scions thereby becoming blighted from frozen sap. But here, Mr. President, I must close, as I suppose the rule here applies, as at the Missouri Convention, that was passed there, viz: "Be it resolved that at this convention no discussion will be permitted on religion, politics or pear blight." Many people imagine that the pear is a short lived tree, and conclude it's not worth the trouble to set them out, but I will give you a few facts which I think will convince the most sceptical. The pear in its wild state is more hardy and longer lived than the apple. Mr. Box mentions several that are known to be over 400 years old. One pear tree in Herefordshire, England, Loudon says, in 1805 covered more than half an acre of land, and from the fruit of it, on more than one occasion, there were fifteen hogsheads of perry made, in a single year. Another remarkable pear tree grown in Illinois, which at forty years old measured round the trunk six and one-half feet nine feet from the ground; it yielded in 1834, 184 bushels pears, and in 1840, 140 bushels.

Also along the Detroit River, on both the Canadian and the American sides, are found many very old large trees still growing and bearing fruit of quite as good quality as some of more modern origin.

You have only to ask the schoolboy of to-day, or the schoolgirl either, what is the best fruit of to-day, and they will tell you at once the pear.

"For it keeps well, it eats well, it is juicy all the year:
No other fruit compares with it, the rich, the luscious pear."

## CURRANTS, AND HOW TO GROW THEM.

By R. B. Whyte, Ottawa.

Of all fruits that can be grown in this country the currant gives the greatest return for the labor expended. No matter how poor the soil or how careless the cultivation you can expect a crop of currants, though the difference between a box of currants such as is generally offered for sale, and a box of, say "Moore's Ruby," such as I have grown, every bunch with twenty to twenty-four berries on it, is very great, and the difference in quality is even greater. There is no fruit that responds so readily to good feeding and careful cultivation.

The best soil is a good sandy loam, which should be deeply spaded and well manured before planting, as the roots grow very close to the surface and should be interfered with as little as possible after planting.

All varieties grow freely from cuttings of the present year's growth, which do best planted in August, though very well any time before frost or in the following spring.

Make cuttings about six inches long, plant in rows a foot apart, inclining the cuttings at an angle of forty-five degrees, so that the lower end won't be too far below the surface, leaving one inch above ground; mulch with light manure or sawdust to keep the earth moist, and by the end of the following summer ninety per cent. of them will be good strong plants ready to be set out in their permanent quarters. Give them plenty of room—about six feet each way is little enough; after planting, mulch with well-rotted manure. Of course a year can be saved by buying your plants from a nurseryman, and they are sold so low now, that when only a few are wanted for home use it is the better way.

All the cultivation that is necessary the first year is to keep down weeds and pinch out the tip of any shoot that is growing too fast for the rest.

The second year there will be a few bunches of fruit, the third year enough to pay expenses, and a full crop every year after for ten or twelve years, when it is better to start a new plantation, as the finest fruit is got from bushes three to six or seven years old. Pruning after the second year consists in cutting out all surplus canes from the centre of the bush, and all that tend to lie on or close to the ground. The best season for pruning is in August after the fruit is off and wood growth has ceased.

If you want to grow the largest berries possible, in June when the new wood is about six inches long pinch out the ends of every shoot. By so doing you check wood growth and throw the energies of the plant into the fruit, and also very much reduce the amount of pruning necessary in August. Good feeding requires a mulch of three or four inches of stable manure every fall, two to three feet on each side of the row, which should be supplemented by a dressing of bone dust and a good potash fertilizer, at the rate of one and one-half pounds of the mixture to each bush in the spring. The winter mulch may be forked in *very lightly* in the spring, or may, if not objected to on the ground of untidiness, be left on all summer. The less the earth is disturbed within three feet of the stem the better, as the roots being near the surface a great deal of mischief is done by deep cultivation, even with a digging fork. A spade should never be used near currants. If the soil is very light a mulch of straw or marsh hay is very useful in conserving moisture in a dry season; but if water is available and the rake is industriously used to keep the surface friable, a mulch is not necessary.

The great enemy of the red and white currant is the "currant worm," which works such havoc in May, if not checked, destroying in a few days every leaf on the bush, and with the leaves goes the crop for that season. The first brood is hatched out in this locality about the 20th to 24th of May, As soon as they begin eating the leaves apply Paris green, one teaspoonful to a wooden pail of water, with a whisk, or better, a spray pump, being careful to get it well into the centre of the bush when the worms begin their work. One application, as a rule is enough for the season, but some years a second brood

appears as the fruit ripens. It is not safe to use Paris green then, but a good substitute is white hellebore, about one ounce to a wood pail of water, applied in the same way as the Paris green.

The only other enemy of the currant worth considering is the currant stem borer. The parent insect lays her eggs near the buds; when hatched the larva eats into the centre of the stem, travelling up and down living upon the pith. Their presence may be detected by the sickly look of the leaves and small size of the fruit. The only remedy is to cut out the afflicted canes and burn them.

In black currants, Leés Prolific is a good variety, much superior in size and flavor to Black Naples or Black English. Champion and Prince of Wales are said to be good kinds, but I have not fruited them yet. The Crandell so industriously puffed by some nurserymen is nothing but the old Ribes Aureum or Golden Currant of old gardens, a very pretty flowering shrub but as a fruit it is utterly worthless. The crop is so small as not to be worth picking and the quality so poor that I have never met anyone that would eat a second one.

In whites, by far the most extensively grown is "White Grape," long considered the finest flavored of all currants. Unfortunately it is rather small in size and has a bad habit of dropping the end berries of the bunch. Last summer I fruited for the first time "White Gondoin" and was very much pleased with it. Though rather more acid than White Grape it is so much larger in bunch and berry that it will prove a formidable rival to that old favorite.

Among the reds "Moore's Ruby" is decidedly the best variety I know of—an upright, strong grower; bunch long—frequently twenty-two long berries in the raceme; berry large; a prolific bearer, and quality the very best, sweeter and finer flavored even than White Grape. I have grown it for ten years and have yet to find a fault in it.

An excellent variety is "Wilder Red," not so sweet as Moore's Ruby but very desirable, as large in bunch and berry as "Fay" and a much stronger grower. The weak growth of the "Fay" is its greatest defect; one of the largest berries, good bunch, good quality and a heavy bearer, but it is such a straggly grower and so prone to split in the forks when loaded with fruit that it will always be a short-lived bush.

A new variety much advertised, "North Star," does not justify the claims made for it. Though a strong grower and apparently going to be a heavy cropper, neither in size or quality is it the equal of any of those mentioned above.

"Raby Castle" and "Victoria" are two old sorts that if not the same are so nearly alike that there is no use growing both of them, heavy bearers, but only medium in size and quality.

The "Cherry," though a large showy berry, is too shy a bearer to be a good market variety, and too acid to be suitable for home use.

"London Red," though a very heavy bearer, one of the heaviest with me, is too small and too acid to be desirable.

"Red Dutch," though better in quality, is too small to be profitable.

## SOME GOOD HERBACEOUS PERENNIALS.

By R. B. Whyte, Ottawa.

Herbaceous perennials are those plants whose roots remain in the ground from year to year, the foliage dying down to the surface of the ground every autumn to grow up with renewed vigor in the spring. As most plants of this class do best if their roots are not disturbed for several years, it is necessary in preparing a perennnial border to dig deeply and fertilize well before planting. Though many of them are perfectly hardy without protection all are the better of a coating of four or five inches of strawy manure in the fall. Leave it on as late as possible in the spring so that the rain may wash out

the soluble plant food. As soon as growth begins rake off and remove the surplus straw and rake or very lightly fork over the surface, being careful not to disturb the roots. Never use a spade in the perennial border.

A very frequent objection to the free planting of herbaceous perennials in the garden border is that it costs too much to buy the plants. There may be some truth in this if one wants to get all the novelties as they are sent out at high prices; but there are many of them that cost little more than geraniums or other bedding plants that have to be renewed each season, and with this great advantage in favor of perennials, that they increase in vigor and beauty every year, and after the third season most of them can be divided and multiplied as much as desired; while if one is willing to wait a year many of them can be grown from seed at a very small expense.

All of the following are well tested sorts, quite hardy even in this cold section of Ontario, and vary in flowering season from the first week in May till the snow falls:

Iceland Poppy, *Papaver Nudicaule.*—This dainty little poppy, one of our most valued perennials, opened its first flowers on May 4th last season, and was more or less in bloom till the last of October. The flowers, in white, yellow and orange-red, of which yellow is the commonest, are somewhat cup-shaped, one and one-half to two and one-half inches across, on long, wiry stems about twelve inches above the leaves, are well adapted for cutting—if cut in the morning early after opening, they last for several days. It is easily grown from seed, and will bloom the first year if sown in April or early in May. It, like all poppies, does not take kindly to transplanting and should be sown where it is to remain. They are easily wintered, even as far north as Ottawa, if covered in the fall with straw or cedar brush.

Oriental Poppy, *Papaver Orientale.*—A great contrast to the dainty little Iceland is the gorgeous Oriental Poppy, one of our most striking and showy garden flowers. The great flowers, six to eight inches across, dark scarlet in color, are held well up above the leaves on long, leafy stalks. Unfortunately the flowering season is short—only two or three weeks in June—and their glory is gone, though some years they show an odd bloom during the summer. They also can easily be grown from seed and are quite hardy.

Tall Leopard's Bane, *Doronicum.*—A very desirable perennial, that is not as well known as it should be is the Tall Leopard's Bane, *Doronicum plantagineum excelsum*, a very early-blooming yellow composite, coming into flower early in May, and lasting two to three months. The large flowers, about four inches across, are borne on sparsely leafy branching, stems three to four feet high, rising from a large cluster of heart-shaped leaves on long petioles, decidedly the best yellow composite. Another Leopard's Bane is *D. Caucasicum*, not so large in plant or flower, but otherwise much like it. Both are usually propagated by division in spring or fall.

Double Sunflower, *Helianthus Multiflorus fl.pl.*—A deservedly popular autumn flowering yellow perennial is the Double Sunflower, rather rough in leaf and stalk to make a good cutting flower, but very effective in the garden. The flowers are from three to four inches across, a good rich yellow, perfectly double, and last a long time after opening. In bloom from August till frost comes. It has not proved perfectly hardy here, and requires the protection of a good mulch of manure during the winter.

Chinese Bell Flower, *Platycodon Grandiflorum.*—This is the best blue perennial we have, and grows from two to three feet high, and is covered from middle of July till October with deep blue bell-shaped flowers, from two to three inches in diameter, perfectly hardy and easily grown from seed. If planted in May will flower abundantly the following year. There is a white form that is not so desirable, as a slight tinge of blue gives it a faded look.

The genus *Spiræa* furnishes some of our very best perennials. Among the shrubby species Van Houtti, Bumalda and many others are well worth growing where space will permit. The best of the herbaceous species are the following:—

Double-White Meadowsweet, *Spiræa Ulmaria fl.pl.*—From a dense cluster of root leaves rise leafy stalks about three feet high, covered on the top with a solid mass of creamy-white fluffy flowers, from about July 1st to August 15th. The foliage is quite

ornamental before and after flowering, if the flower stalks are cut out after blooming. It is propagated by division in spring or fall, and should be shifted every three or four years, as it increases so rapidly that it is apt to die in the centre of the clump if left too long in the one place.

Queen of the Prairie, *S. Venusta.*—A weaker growing species. Does not make such a bushy clump as *Ulmaria*, but grows about a foot higher. The clusters of flowers are more elongated and are a bright pink in color. Season about a week later—decidedly the showiest of the herbaceous *Spiræas.*

*S. palmata elegans.*—A very graceful plant, about three feet high, with flattish clusters of pink and white flowers, lighter and more delicate in growth than *Ulmaria*. Though somewhat of the same habit, it is upon the whole the most beautiful and desirable of the genus.

*Phlox decussata.*—The new varieties of the old fashioned perennial *Phlox* have raised it from the position of a very common place flower, limited in color and small in size, to that of one of our most valuable perennials. From no other can we get such a mass of color in the border or such a variety of shades. One English house catalogue, 145 varieties ranging from white through all shades of pink to dark red, and from the palest violet to dark purple. Their season of bloom is from July till fall, some varieties flowering earlier than others. The first clusters are the largest and finest, but if the tops are cut off some of the shoots as soon as the buds form, they branch out and produce fine heads of flowers late in the season.

A good half dozen varieties are:

The Pearl, white.

Sir Richard Wallace, large white with violet eye.

La Soleil, lilac-rose.

Isabay, orange salmon.

August Riviere, fiery-red shaded violet.

Frau Von Spiemen, salmon pink; a very fine sort, flowers one and one-half inches across, slightly curled inwards at the edge.

Gas Plant, *Dictamnus Fraxinella.*—A very showy and interesting plant that should be more widely known. It increases so slowly, often growing for years without any apparent increase in size, so that it has not been very widely disseminated, very few gardens being so fortunate as to possess a good specimen. It grows about two feet high, a well established plant, being about as much in diameter, each stalk terminated by a spike of rosy flowers eight or ten inches long, at their best for a month after May 20th. The leaves resemble those of the Ash and if gently pressed emit a perfume like lemon peel, but if bruised the odour is balsamic and somewhat strong for most tastes. The volatile oil that produces this odour is secreted so freely that if a match is applied to a newly-opened flower on a hot day a slight explosion ensues.

*D. F. alba* is a very handsome variety with pure white flowers.

Moneywort or Creeping Jennie, *Lysimachia Nummularia.*—If you have any place too much shaded by house or trees for any of the ordinary flowering plants, or even grass, to grow, but which you would like to have covered, try *Lysimachia Nummularia*, Money Root or Creeping Jennie, by far the best creeping perennial we have for that purpose. It spreads rapidly, rooting at the joints and throwing out lots of side branches, but as it does not produce underground shoots it is easily kept within bounds. The leaves are oval in shape, about twelve inches long, of a rich dark green color, and are produced so freely as to completely cover the ground. The flowers, bright yellow, cup-shaped, about three-fourths of an inch across, are in great abundance during June and July.

# APPENDIX I.

## OUR AFFILIATED HORTICULTURAL SOCIETIES.

All members of affiliated societies receive free the *Canadian Horticulturist* (monthly), recently enlarged to include floriculture; the Annual Report of the Fruit Growers' Association of Ontario; some new flowering or fruiting plant from that Association; and a lecture at the society hall by some competent horticulturist, sent by the Ontario Association.

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### BELLEVILLE.

OFFICERS FOR 1897.—*President*, W. C. Reid; *1st Vice-President*, S. J. Wedden; *2nd Vice-President*, William Kemp; *Secretary-Treasurer*, W. Jeffers Diamond. *Directors.*—A. M. Ketcheson, John Aris, Dr. Tracy, John Harris, James Copeland, William Connors, J. W. London, F. Davey Diamond, W. Jeffers Diamond. *Auditors.*—J. W. Butterfield, William Rodburn, James A. Conger.

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### BRAMPTON.

OFFICERS FOR 1897.—*President*, Dr. C. Y. Moore; *1st Vice-President*, Henry Dale; *2nd Vice-President*, John Jeffers; *Secretary-Treasurer*, Henry Roberts.

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### BURLINGTON.

OFFICERS FOR 1897.—*President*, Geo. E. Fisher; *Vice-President*, J. S. Freeman; *Secretary Treasurer*, A. W. Peart; *Assistant-Secretary*, Geo. N. Peer. *Directors.*—Apples, E. Peart; grapes, Chas. Dynes; pears, W. V. Hopkins; peaches, John Ireland; plums, W. F. W. Fisher; cherries, T. Foster; vegetables, J. W. Bridgeman; shipping, Joseph Lindley, J. S. Freeman, O. T. Springer. *Auditors.*—J. R. Blanchard and F. Parsons. *Executive Committee.*—Dr. Husband, Alex. Reach, S. W. T. Glover.

Reports on the various fruits for the year were made by Geo. S. Fisher, on apples; A. W. Peart, grapes; H. T. Foster, small fruits; W. V. Hopkins, pears; W. F. W. Fisher, plums, and J. S. Freeman, shipping.

The President, Geo. E. Fisher, in his annual address, referred to the usefulness of the Association in promoting mutual sympathies and co-operation among its members, and in affording opportunities for the interchange of knowledge and experience. The unusual apple twig and pear blight was one of the striking features of the past season. He believed that better times were ahead of us, and that we might expect higher prices in the future than those that prevailed during the past season. The time had come, he thought, when more attention should be paid to quality and marketing. He also spoke of the possibilities of cold storage as applied to our more perishable fruits, and considered that when it was an accomplished fact, large quantities of pears and grapes, as well as tomatoes, would be shipped to Great Britain.

We are able to report another successful year for our Society. Our numbers are gaining year by year, and a deep studious interest in all pertaining to fruit-growing pervades our Association. Three regular meetings, several special ones, and the annual have been held.

At each of these, valuable information has been given. The acreage is still increasing, more particularly in the direction of smaller fruits. We believe, however, that the conditions affecting our business demand for the future *intensive* rather than *extensive* fruit culture, that we should take better care of the trees we already have rather than plant out more, and thus improve the quality and quantity per acre.

In common with the rest of the Province we had a very heavy crop of apples. Most of our members packed their own apples and sent them to the Old Country. Early in the season the twig blight did some damage to such apples as the Holland Pippin, the Ribston, the Pewaukee, Gravenstein and Snow. Pear blight too, did a good deal of mischief. Fungous diseases cut little if any figure here last season. Apples were clean, and grapes were without mildew. Of insects the Codling moth did the most damage.

During the year papers or addresses were given by Messrs. O. T. Springer on "Apples"; W. F. W. Fisher, on "Currants"; the Secretary, on "Horticultural Education"; and Mr. Beadle, of Toronto, on "Insect and Fungus Pests."

## DURHAM.

Officers for 1897.—*President*, Christopher Firth; *1st Vice-President*, G. McKechnie; *2nd Vice-President*, Robt McFarlane; *Secretary*, Wm. Gorsline; *Directors*, D. Jackson, Henry Parker, N. H. Campbell, Thos. Brown, Dr. James Gun, Jas. Birt, C. L. Grant, Geo. Bennie, John H. Kilmer, John Kelly.

## GRIMSBY.

The annual meeting was held on the date fixed by law, and the following officers elected: *President*, Mrs. E. J. Palmer; *Vice-President*, L. Woolverton; *Second Vice-President*, Mrs. A. Pettit; *Secretary-Treasurer*, E. H. Reid; *Directors*, Mesdames D. V. Lucas, H. Smith, J. W. G. Nelles, and Messrs. A. Terryberry, W. Gibson, C. W. VanDuzer, John Grout, A. Pettit, E. H. Reid,

It was resolved to make a distribution of potted chrysanthemums in early summer, and have a chrysanthemum show in November.

At the spring meeting, in 1896, the following paper was read:

### HINTS ON THE CULTIVATION OF THE CANNA, TUBEROUS BEGONIA SWEET PEA, AND CHRYSANTHEMUM.

By L. Woolverton.

Canna.—I do not think cannas have yet been grown very much about Grimsby, and yet they are one of the best plants for the lawn. Massed in the rear of the pleasure ground, their tropical appearance and stately habit of growth, with their tall spikes of fiery bloom, they have a very fine effect. I am glad our Society is being the means of introducing this excellent plant into more general cultivation, and, as a result of the little packages being distributed to-night, I hope to see many lawns and gardens in Grimsby made attractive with magnificent beds of cannas.

Cannas are easy of cultivation. The great points to be observed are rich soil, moisture and sunlight. Like the dahlia, they need to be started early in March or April in the house or in a hot-bed, and then when all danger from frost is over, they may be planted out in the open ground. Plant in rich soil, working in plenty of manure first. Be sure there is no shade, and keep the soil well stirred up. If the season is dry, give a liberal quantity of water in the evening, and you will be rewarded with a brilliant show of bloom.

The flowers of the canna have been much improved of late through the efforts of M. Crozy, the French hybridist. The variety named after him is still one of the best, some of the blooms reaching a diameter of six inches. Other good varieties are Star of 1891, and Crown Jewel. The varieties distributed this year by the Ontario Fruit Growers' Association are unnamed hybrids, many of them being hybrids of Madame Crozy. These will do well for our first experience with cannas, and another year we should try some named varieties

The canna may also be grown in the window garden. For this purpose it should be started in the fall in six-inch pots in a warm, sunny window, with plenty of water. When pot-bound, remove to ten-inch pots, in which they will bloom freely. In the spring, plant them in the open ground and they will recover their vigor and be ready for blooming next winter.

Tuberous Begonia. I have had no success with this flower as yet, but I hope that I have learned enough from past failure to succeed during the coming season The bulbs should be planted in pots one-half inch larger all around than the bulb itself, and scarcely deep enough to be out of sight. They should be then kept in a warm dark place until the roots have formed, and then afterwards brought to the light in a temperature of about sixty degrees. In about six weeks after the tubers start to grow, they should be shifted into five-inch pots and left in them to bloom, giving plenty of water and shading them from the hot sun. Bulbs of this flower were distributed by our Society a year ago, and very many members reported failure through mismanagement, If there are any who had success, we hope they will report to-night and describe the treatment they gave them.

Sweet Pea. The sweet pea is one of the popular flowers of the present day, and very appropriately has been placed in the list distributed among the members of our progressive society. It is not a new flower. About two hundred years ago it was introduced into England from Sicily, but in those days there were only two varieties, known as the White Sweet Pea and the Painted Lady. Though much prized for its perfume and beauty, it is only of late years that it has become a special favorite, and its present popularity is largely due to that sweet pea specialist, Mr. Henry Eckford, of Shropshire, England, who has given the world a large number of improved varieties. The greatest American sweet pea genius is Mr. W. T. Hutchins, who wrote "All about Sweet Peas," and the largest grower in the world is Mr. W. C. Moore, of California, whose sweet pea garden covers 250 acres. I take it none of us will ever want to grow so many as that, but if every member succeeds with his or her ounce of seeds, the sweet pea will be the flower in Grimsby in 1896. How shall we succeed best then?

1. By choosing a *suitable place*, not too prominent. It is a modest flower, and will be best planted at the side or rear of the house and allowed to ramble about upon chicken wire fence, over bushes, or, if you choose to take the trouble, a neat wire trellis may be built on purpose for its accommodation Under favorable conditions it will often climb up as high as four or five feet, or sometimes more.

2. *Your soil must be rich and moist.* Thin dry soil, such as many of us have tried them on, the writer among the number, is unsuitable and will produce only failure. Such soils must have plenty of manure and plenty of water to give any good results at all.

3. *Cultivate well* until blooming time. Then, if sown thickly, thin the plants to six or seven inches apart.

4. *Plant deep.* Make drills from four to six inches deep and after sowing cover the seeds with about an inch of soil, drawing in the earth as they grow until the furrows are full.

5. *Sow early.* Any time in April will do in this latitude. Like garden peas, they are very hardy and may be given an early start with perfect safety.

6 *Pick pods* as soon as formed, or rather keep the flowers picked so closely that no pods will form.

As to varieties, Professor Bailey recommends the following as the six best: Blanch Ferry, Apple Blossom, Emily Henderson, Mrs. Gladstone, Butterfly and Countess of Radnor.

CHRYSANTHEMUMS. Since we have two named varieties of chrysanthemums on our distribution list, it is important that we consider how to plant them to obtain the best results. Any one who has attended the chrysanthemum shows, brilliant with their profusion of magnificent blooms of immense size and peculiar character, such as have been held in our cities during the past few years, will be full of enthusiasm over the possibilities in store before us in entering upon the growing of chrysanthemums, and will unite with me in the hope that our society will be able to attempt a chrysanthemum show of our own on a small scale in the autumn of 1897, if not before.

The little plants now given you should be planted at once in three-inch pots in good rich soil. Rotten sod enriched with one-third manure makes the best kind of potting soil. Be sure to firm the earth well about the roots of the plants, water and then fill up with loose earth. Set them in the shade for a few days and afterwards bring them to a sunny window. From the first to last the chrysanthemum needs an abundance of water and plenty of sunshine. As soon as the roots of the plant reaches the sides of the pot, shift to a pot six inches in diameter. This transplanting can be done without any shock to the growth of the plant, because a ball of earth will remain attached.

Sometime in June when conditions are favorable to growth, the plants may be set in the open ground for the summer, and lifted into larger pots, say nine inches in diameter, sometime in September in which they may be left to bloom. Another plan is to shift them into larger sized pots in the month of June, instead of planting them in the open ground, and to set these pots in a bed of coal ashes, where they may remain until about the first of October when they should be housed. If rain is lacking, water them frequently and never allow them to remain dry.

If you want fine blooms, one important point is thinning the buds. The enormous specimens which we see at chrysanthemum shows have been produced by removing all buds except the one which is to produce the exhibition bloom, and thus the whole strength of the plant is thrown into the one bloom. But for ordinary purposes, this method is not desirable. A better plan is simply to pinch back the leading shoot so as to secure free branching, then allow one terminal bud on each branch to mature a bloom. It is better to do this than to allow all the buds in a cluster to produce flowers.

After blooming is over, cut down the stem to within six inches of the ground and winter in the cellar. The name of the variety may be written on the pot.

I have thus attempted to give you a few brief directions for the cultivation of these flowers which we are distributing during the present season, directions which I am sure will be of as much value to myself as to any other member of this society. We hope to learn much by reading, by experience and by comparing notes with each other at our meetings, and trust that, as a result, greater skill in the production of beautiful flowers will be attained by the members of our society.

## KINCARDINE.

*President*, A. C. Washburn; *First Vice-President*, George Sturgeon; *Second Vice-President*, Mathew McCreath; *Secretary-Treasurer*, Joseph Barker.

*Directors*:—W. M. Dack, E. Miller, Dr. Jno. McCrimmon, S. H. Perry, R. Malcolm, N. McPherson, A. Campbell, P. S. I., Jno. Ruettel and A. Lutterell; *Auditors*, Andrew Malcolm and John H. Leongall.

## LINDSAY.

OFFICERS FOR 1896: *President*, W. M. Robson; *Vice-President*, Alex. Cathro; *Second Vice-President*, R. Chambers; *Secretary-Treasurer*, T. J. Frampton.

*Directors*:—W. King, Jos. Cooper, Alex Skinner, T. Bryant, Jos. Rickaby, Thos. Connolly, T. Harrington, W. H. Stevens, J. H. Knight.

## MEAFORD.

Officers for 1896: *President*, Oscar Boden, Esq.; *First Vice-President*, Chas. Ellis, Esq.; *Second Vice-President*, Capt. Geo. Sutherland; *Secretary-Treasurer*, A. McK. Cameron; *Auditors*, F. Abbott, Esq. and C. H. Jay, Esq.

*Directors*.—D. A. Ferguson, A. Tait, T. Plunkett, G. G. Albery, Jas. Trout, N. Snider, W. T. Moon, A. Gifford, and Innes Stewart.

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## NIAGARA FALLS.

Officers for 1897:—*President*, W. P. Lyon; *Vice-President*, Roderick Cameron; *Second Vice-President*, Thomas Berriman; *Secretary*, E Morden; *Treasurer*, J. G. Cadham. *Directors*, Mrs. A. Land, Mrs. James Neilson, Mrs. McNally, Miss Willox, George A. Pyper, George Law, Rev. Canon Bull.

This active flourishing society numbered over 100 members in 1896, and over fifty members already for 1897.

On March 10th, 1896, a show of house plants was made. A. McNeill, of Windsor, James Sheppard, of Queenstown, and T. Greiner, of LaSalle, N.Y., delivered instructive addresses, and a large audience heard them.

On June 18th, the Society, with many excursionists, visited Guelph. On August 27th a very fine exhibition, in which Begonias much abounded, was held. An orchestra in the evening was much appreciated; many members exhibited plants and flowers. Pomegranates, Wild Grapes and some very fine Japan Plums figured among the fruits. In November the Society gave a very fine Chrysanthemum exhibition to all comers, free of cost. The Society holds business meetings on the second Monday of each month. On the third Monday they hold open meetings to which all members and their friends are invited. Essays, lectures and discussions are in order. Fruit and flowers for name are brought to the meetings. A small flower show is often an attractive feature.

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## PORT DOVER.

*President*, James Symington; *1st Vice-President*, H. Holden; *2nd Vice-President*, Wm. Stamp; *Secretary-Treasurer*, W. J. Carpenter. *Directors*, D. Woolley, Wm. Duncan, B. Bowlby, Wm. Corbett, C. Fairchild, R. Fleming, George C. Ryerse, A. G Rose and W. J. Carpenter; *Auditors*, L. G. Morgan and S. Mancer.

A touching tribute of respect for the memory of the first Vice-President, the late Mr. C. C. Olds, was paid by several members present, and the Secretary was instructed to forward a letter of condolence to the relatives of the deceased.

The Society was inaugurated last February (1896) with only about a dozen members. Since then, owing to the activity of its officers and members, it has now the full complement required by the law to entitle it to the Government bonus of $100, which will help not a little to increase the efficiency and influence of the organization during the coming year. Its members comprise a good many of the most prominent and influential fruit growers and others in the district, and if the present interest in it is kept up it will prove of great value to the community. All members are entitled to a copy of the *Canadian Horticulturist*, recently enlarged and improved: also to a copy of the annual report of the Ontario Fruit Growers' Association, and a choice of one of the following: 1. New Japan Lilac; 2. Lilium Speciosum Roseum; 3. Conrath Raspberry; 4. Dempsey Pear, which is a cross between a Bartlett and a Duchess

## PICTON.

Officers for 1897 :—*President*, Thomas Bog ; *1st Vice-President*, H. T. Hopkins ; *2nd Vice-President*, Mrs. A. M. Terrill ; *Secretary-Treasurer*, Walter T. Ross. *Directors*, John Richards, Wellington Boulter, Mrs George W. McMullen, Mrs. H. W. Branscombe, John Davis ; *Auditors*, J. F. Gillespie, Alex. McDonald.

The present number of members is sixty-six.

## PORT COLBORNE

*President*, E. O. Boyle ; *1st Vice-President*, W. W. Knisley ; *2nd Vice-President*, Rev. J. M. Smith ; *Secretary-Treasurer*, A. E. Augustine. *Directors*, J. C. McRae, S. J. McCoppen, Fred Hoschke, D. W. McKay, J. H. Smith, A. E. Augustine, Mrs. J. Steele, Mrs. Peter Welsh and Mrs Menno Moyer ; *Auditors*, Messrs. S. J. Hopkins and E B. Milliken.

There was a gloom cast over the meeting, as one of the most active and influential members has passed away in the person of Mr. L. G. Carter who died on December 30th, at his residence " Rose Lawn." It was through Mr. Carter's efforts, that a Horticultural Society was organized here in 1895, and he was 1st Vice-President at the time of his death.

The following resolution of sympathy to Mrs. Carter was moved by Mr. W. W. Knisley, and seconded by Mr. E. B. Milliken.

Resolved, that this society desires to place on record its sincere sorrow for the loss of Mr. L. G. Carter, who for so many years took a prominent and public spirited part in all undertakings tending to promote the progress and welfare of this community, and whose name is honorably indentified with the history of this locality during the greater portion of his long and useful life and promoter of this society. That a copy of this resolution be extended to Mrs. Carter and the bereaved family and also published in the *Canadian Horticulturist* and *Welland Tribune* and *Telegraph*.

## PORT HOPE.

Officers for 1897 :—H. H. Burnham, *President* ; Wm. Craig, *1st Vice-President* ; P. Brown, *2nd Vice-President* ; A. W. Pringle, *Secretary-Treasurer* *Directors*, John Smart, W. W. Renwick, T. G. Watson, Thos. Wickett and Samuel Purser. The following ladies were appointed Sub-Directors and Advisory Board :—Mrs. T. M. Benson, Mrs. H. H. Burnham, Mrs. James Robertson, Mrs. H. M. Rose, Miss Choate, Miss Evans.

## SMITH'S FALLS.

Officers for 1897 :—*President*, J. S. McCallum, M D ; *1st VicePresident*, Elliott Ballantyne ; *2nd Vice-President*, Mr. Geo. Steele. *Directors*—Mrs. J. S. Foster, Mrs. W. M. Richey, Mrs. G. F. McKinnon, Miss. Alice Gould, J. M. Clark, J. A. Houston, John Rabb, R. Milliken, John Clark.

## SIMCOE.

Officers for 1897 :—*President*, Rev Canon Young ; *1st Vice-President*, J. H. Ansley ; *2nd Vice-President*, H. H. Groff ; *Secretary-Treasurer*, Henry Johnson ; *Directors*—Henry Johnson, Albert Gilbert, Joseph S. Wychoff, Daniel Matthews, W. E. Tisdale, John A. Campbell, Harry A. Carter, Geo. J. McKill, Thos. Hoddow ; *Auditors*—H. B. Donly, W. D. Boyd.

## WATERLOO.

The second anuual meeting of the Waterloo Horticultural Society was held on Wednesday evening, January 13th, in the old Council chamber. There was a good attendance, including a number of ladies. Mr. J. Lockie, the president, occupied the chair The Secretary read the minutes of the previous meeting, which were confirmed. The Directors' report, which is subjoined, was read by the President, and the financial statement by the Secretary. The reports were adopted.

The following office-bearers were elected for the ensuing year:—*President*, James Lockie, *1st Vice-President*, Chas. Moogk; *2nd Vice-President*, Mrs. P. Hohmeier. *Directors*—Mrs. Dr. Webb, Miss M. Bruce, Mrs. P. Gleiser, Messrs George Bolduc, C. M. Taylor, J H. Ross, W. A. Raymo, A. Weidenhammer; *Secretary-Treasurer*, J. H. Winkler; *Auditors*, Geo. Davidson and L. W. Shuh.

### *Directors' Report.*

Your Directors, in making their second annual report, have much pleasure in congratulating the members on the continued success of this Society, our membership having increased to 125 the past year, each of whom received *The Canadian Horticulturist* and bound report, and we distributed in premiums 61 cherry trees, 61 plum trees, 61 pear trees, 23 spireas, 23 roses, 23 clematis, 96 cannas, 32 Dahlias, 320 gladioli, 312 house plants and 1,500 hyacinth bulbs.

The open meetings for discussion and talks on plants, fruits and flowers, have been kept up during the year, and we believe have been profitable.

On the 17th of March last the Fruit Growers' Association sent Mr. D. W. Beadle, the well known horticulturist, here who delivered an excellent lecture on "The Garden" in the Town Hall to a good audience, who showed their appreciation and interest in the subject by a number of questions at the close of the lecture.

On the 20th and 21st August the annual free exhibition of flowers, fruit and vegetables, was held in the Town Hall, and was in every respect a success. At exhibitions, where prizes are given, each class must be arranged together for comparison, but in this all were placed for effect; flowers were arranged with foliage and decorative plants, so that the beauties of all were brought out in the best manner. The arrangement of these by the ladies was admired by all, and we do not think could have been improved on.

The season having been more favorable, the exhibition of fruits and vegetables was greatly in advance of the previous year.

We found that keeping the exhibition open for two days instead of one as heretofore was a great gain, giving more time and opportunity to examine and discuss the exhibits.

The second afternoon was specially children's day, as your Directors feel that to interest the young in such things is the best guarantee of future interest and improved taste in this direction. On both evenings the hall was crowded with interested and delighted visitors. Your Directors feel that this manner of conducting the affairs of this Society (as advised by Mr. Beall) at its organization), by having its exhibitions free in every respect, no prizes, nor admission fee, but open to all is altogether the best plan, and fully carries out the intention of the Government in assisting these societies. Where prizes are given or admission charged only a few are benefited, but in this way it is made a public benefit and a practical educator.

Your Directors have much pleasure in stating that the annual meeting of the Ontario Fruit Growers' Association will be held in the Town Hall here in December next, to discuss the important question of "How to make fruit growing profitable." The leading fruit growers of Canada will be present and take part, and we trust each member of this Society will use every influence to insure a large attendance during the three days' session, and especially try and induce the farmers to attend, as the information in regard to fruit growing is certain to be of great value to all.

The reports of the Secretary-Treasurer and Auditors are before you, and we trust our successors now to be elected, and our citizens generally, will continue as hitherto to support and assist in the good work of the Waterloo Horticultural Society.

By order of the Board,

JAS. LOCKIE, President.

WATERLOO, Jan. 13th, 1897.

*Financial Report.*

| RECEIPTS. | | EXPENDITURE. | |
|---|---|---|---|
| Balance on hand from 1895 | $97 85 | D. W. Beadle | $1 00 |
| Members' fees | 125 00 | Freight | 1 86 |
| Sale of bulbs | 5 00 | H. H. Groff | 12 00 |
| Government grant | 94 00 | Grimsby Nursery | 49 38 |
| | | Webster Bros. | 15 04 |
| | | Fruit Growers' Association | 25 00 |
| | | Exchange | 80 |
| | | J. Lockie, bulbs | 64 13 |
| | | Hoffman and others | 6 45 |
| | | Printing | 15 00 |
| | | Fruit Growers' Association | 75 00 |
| | | Exchange | 25 |
| | | Bricker & Diebel, cotton bags | 2 87 |
| | | Balance on hand | 53 07 |
| Total | $321 00 | Total | $321 85 |

## WOODSTOCK.

OFFICERS FOR 1897 :—*President*, D. W. Karn ; *1st Vice-President*, G. R. Pattullo ; *2nd Vice-President*, W. H. Van Ingen ; *Treasurer*, J. S. Scarff ; *Secretary*, R. B. Thornton ; *Directors*—E. Hersee, Frank Harris, J. Silcox, F. Mitchell, Fred. Dunn, E. W. Snelgrove, M. S. Schell, T. H. Parker and W. Newton ; *Auditors*—J. Pike and T. L. Clarkson.

# CONSTITUTION AND BY-LAWS OF THE ASSOCIATION.

## CONSTITUTION.

Art. I. This Association shall be called "The Fruit Growers' Association of Ontario."

Art. II. Its object shall be the advancement of the science and art of fruit culture by holding meetings for the exhibition of fruit and for the discussion of all questions relative to fruit culture, by collecting, arranging, and disseminating useful information, and by such other means as may from time to time seem advisable.

Art. III. The annual meeting of the Association shall be held at such time and place as shall be designated by the Association.

Art. IV. The officers of the Association shall be composed of a President, Vice-President, a Secretary, or Secretary-Treasurer, and thirteen Directors.

Art. V. Any person may become a member by an annual payment of one dollar, and a payment of ten dollars shall constitute a member for life.

Art. VI. This Constitution may be amended by a vote of the majority of the members present at any regular meeting, notice of the proposed amendments having been given at the previous meeting.

Art. VII. The said Officers and Directors shall prepare and present at the annual meeting of the Association, a report of their proceedings during the year, in which shall be stated the names of all the members of the Association, the places of meeting during the year, and such information as the Association shall have been able to obtain on the subject of fruit culture in the Province during the year. There shall also be presented at the said annual meeting a detailed statement of the receipts and disbursements of the Association during the year, which report and statement shall be entered in the journal and signed by the President as being a correct copy; and a true copy thereof, certified by the Secretary for the time being, shall be sent to the Minister of Agriculture within forty days after the holding of such annual meeting.

Art. VIII. The Association shall have power to make, alter and amend By-Laws for prescribing the mode of admission of new members, the election of officers, and otherwise regulating the administration of its affairs and property.

## BY-LAWS.

1. The President, Vice-President and Secretary-Treasurer shall be *ex-officio* members of all committees.

2. The Directors may offer premiums to any person originating or introducing any new fruit adapted to the climate of the Province which shall possess such distinctive excellence as shall, in their opinion, render the same of special value; also for essays upon such subjects connected with fruit growing as they may designate, under such rules and regulations as they may prescribe.

3. The Secretary shall prepare an annual report containing the minutes of the proceedings of meetings during the year; a detailed statement of receipts and expenditure, the reports upon fruits received from different localities, and all essays to which prizes have been awarded, and such other information in regard to fruit culture as may have been received during the year, and submit the same to the Directors or any Committee of Directors appointed for this purpose, and, with their sanction, after presenting the same at the annual meeting, cause the same to be printed by and through the Publication Committee, and send a copy thereof to each member of the Association and to the Minister of Agriculture.

4. Seven Directors shall constitute a quorum, and if at any meeting of Directors there shall not be a quorum, the members present may adjourn the meeting from time to time until a quorum shall be obtained.

5. The annual subscription shall be due in advance at the annual meeting.

6. The President (or in case of his disability, the Vice-President), may convene special meetings at such times and places as he may deem advisable; and he shall convene such special meetings as shall be requested in writing by five members.

7. The President may deliver an address on some subject relating to the objects of the Association.

8. The Treasurer shall receive all moneys belonging to the Association, keep a correct account thereof and submit the same to the Directors at any legal meeting of such Directors, five days' notice having been previously given for that purpose.

9. The Directors shall audit and pass all accounts, which, when approved of by the President's signature, shall be submitted to and paid by the Treasurer.

10. It shall be the duty of the Secretary to keep a correct record of the proceedings of the Association, conduct the correspondence, give not less than ten days' notice of all meetings to the members, and specify the business of special meetings.

11. The Directors, touching the conduct of the Association, shall at all times have absolute power and control of the funds and property of the Association, subject however to the meaning and construction of the Constitution.

12. At special meetings no business shall be transacted except that stated in the Secretary's circular.

13. The order of business shall be: (1) Reading of the minutes; (2) Reading of the Directors' Report; (3) Reading of the Treasurer's Report; (4) Reading of the prize essays; (5) President's Address; (6) Election of officers, and (7) Miscellaneous business.

14. These By-laws may be amended at any general meeting by a vote of two-thirds of the members present.

15. Each member of the Fruit Committee shall be charged with the duty of accumulating information touching the state of the fruit crop, the introduction of new varieties, the market value of fruits in his particular section of the country, together with such other general and useful information touching fruit interests as may be desirable, and report in writing to the Secretary of the Association on or before the fifteenth day of September in each year.

The President, Vice-President and Secretary shall be *ex-officio* members of the Board of Directors and of all Committees. The reasonable and necessary expenses of Directors and officers in attending meetings of the Board of Directors and of Committees shall be provided from the funds of the Association.

*Local Fruit Growers' Association.*

16. It shall be the duty of the officers and directors of the Fruit Growers' Association of Ontario to encourage the formation of local fruit growers' horticultural societies in affiliation with the Ontario Association.

17. Any one may become a member of such local society for one year upon payment into its treasury of a minimum sum of one dollar; and a compliance with clause 18 of these by-laws shall constitute him also a member of the Ontario Association for the same term.

18. On the receipt of the names of such members, with the required fees, the secretary of such local affiliated society may transmit their names and post office addresses, together with the sum of eighty cents for each to the Secretary of the Fruit Growers' Association of Ontario, who will enter their names as members of that society, entitled to all its privileges, providing the initial number of such names be not less than ten.

19. Each local society so affiliating, with a membership of not less than twenty-five, shall be entitled to a visit from some member of the board of directors or other prominent horticulturist, once a year, at their own request; it being understood that the railway expenses of such speaker shall be paid by the Ontario Society, and the entertainment provided by the local society.

20. The proceedings of such local fruit growers' horticultural societies shall, on or before the 1st day of December of each year, be forwarded to the secretary of the Ontario Society, who may cull out such portions for the Annual Report to the Minister of Agriculture for the province, as may seem to him of general interest and value.

21. These local societies, if formed in cities, towns or incorporated villages, may be formed under the Agriculture and Arts Act (see sections 37, 46 and 47) and receive their due share of the Electoral District grant for the support of such societies.

22. Each local affiliated society is further expected to send at least one delegate to the annual meeting of the Fruit Growers' Association.

The Director of the Fruit Growers' Association of Ontario of the Agricultural District in which such society is formed, shall be *ex-officio*, a member of the executive committee of such local society and receive notices of all its meetings.

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AGRICULTURAL DIVISIONS.

1. Stormont, Dundas, Glengarry, Prescott, and Cornwall.

2. Lanark North, Lanark South, Renfrew North, Renfrew South, Carleton, Russell, and the city of Ottawa.

3. Frontenac, city of Kingston, Leeds and Grenville North, Leeds South, Grenville South, and Brockville.

4. Hastings East, Hastings North, Hastings West, Addington, Lennox, and Prince Edward.

5. Durham East, Durham West, Northumberland East, Northumberland West, Peterborough East, Peterborough West, Victoria North (including Haliburton), and Victoria South.

6. York East, York North, York West, Ontario North, Ontario South, Peel, Cardwell, and city of Toronto.

7. Wellington Centre, Wellington South, Wellington West, Waterloo North, Waterloo South, Wentworth North, Wentworth South, Dufferin, Halton, and city of Hamilton.

8. Lincoln, Niagara, Welland, Haldimand, and Monck.

9. Elgin East, Elgin West, Brant North, Brant South, Oxford North, Oxford South, Norfolk North, and Norfolk South.

10. Huron East, Huron South, Huron West, Bruce North, Bruce South, Grey East, Grey North and Grey South.

11. Perth North, Perth South, Middlesex East, Middlesex North, Middlesex West, and city of London.

12. Essex North, Essex South, Kent East, Kent West, Lambton East, and Lambton West.

13. Algoma East, Algoma West, Simcoe East, Simcoe South, Simcoe West, Muskoka, Parry Sound East, Parry Sound West, Nipissing East, Nipissing West, and Manitoulin.

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# ANNUAL REPORT

OF THE

# BEE-KEEPERS' ASSOCIATION

FOR THE

# PROVINCE OF ONTARIO

# 1896.

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*(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)*

PRINTED BY ORDER OF

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1897.

# ANNUAL REPORT

OF THE

# ONTARIO BEE-KEEPERS' ASSOCIATION

# 1896.

*To the Honorable the Minister of Agriculture :*

SIR,—I have the honor to submit herewith the seventeenth Annual Report of the Ontario Bee-Keepers' Association, in which will be found the papers read at the Annual Meeting, recently held at Toronto, and a full report of the discussions thereon. The Report of the Foul Brood Inspector and the audited statement of the finances are submitted herewith.

Your obedient servant,

WM. COUSE,
Secretary.

STREETSVILLE, April, 1897.

# OFFICERS FOR 1897.

*President*, - - - - - - - - - J. K. DARLING, Almonte.

*1st Vice-President*, - - - - - - - W. B. HOLMES, Athens.

*2nd Vice-President*, - - - - - W. J. BROWN, Chard.

*Secretary*, - - - - - - - - - WM. COUSE, Streetsville.

*Treasurer*, - - - - - - - - - MARTIN EMIGH, Holbrook.

*Directors*:

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District No. 5 ..... J. W. SPARLING, Bowmanville.

District No. 6 ..... WILLIAM COUSE, Streetsville.

District No. 7 ..... A. PICKETT, Nassagaweya.

District No. 8 ..... I. OVERHOLT, South Cayuga.

District No. 9 ..... J. B. HALL, Woodstock.

District No. 10 ..... F. A. GEMMELL, Stratford.

District No. 11 ..... W. A. CHRYSLER, Chatham.

District No. 12 ..... H. N. HUGHES, Barrie.

From Ontario Agricultural College ..... Dr. JAMES MILLS, Guelph.

*Auditors*, - - - - - - - - - Mr. HOSHAL, Beamsville, and Mr. NEWTON, Thamesford.

*Foul Brood Inspector*, - - - - - - WM. MCEVOY, Woodburn.

*Assistant Foul Brood Inspector*, - - - - - F. A. GEMMELL, Stratford.

*Representative at the Toronto Industrial Exhibition*, R. F. HOLTERMANN, Brantford.

*Representative at the Western Fair, London*, - JOHN NEWTON, Thamesford.

*Representative at the Central Exhibition, Ottawa*, J. K. DARLING, Almonte.

*Revising Committee*, - - - - - - - D. W. HEISE, Bethesda, and J. D. EVANS, Islington.

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Next place of meeting, Hamilton, in December, 1897.

# LIST OF MEMBERS.

| Name. | P O. Address. |
|---|---|
| Armstrong, James | Cheapside. |
| Allen, A. D | Marlbank. |
| Brenton, F | Corbyville. |
| Black, Alex | Sonya. |
| Best, J. H | Palmoral. |
| Brown, W. J | Chard. |
| Brown, Dennis | Chard. |
| Couse, William | Streetsville. |
| Cummer, D. N | Florence. |
| Camire, Dr. A. O | St François du Lac Yamaska, Que. |
| Cobbald, Paul A | Haileybury, Ont. |
| Chrysler, W. A | Chatham. |
| Craig, W. J | Brantford. |
| Dickson, Alex | Lancaster. |
| Davison, J. F | Unionville. |
| Darling, J. K | Almonte. |
| Davidson, F. J | Uxbridge. |
| Evans, J. D | Islington. |
| Emigh, Martin | Holbrook. |
| Edwards, Albert | Rockland. |
| Farmer, Thos. W | Ancaster. |
| Fixter, J | (Exp. Farm), Ottawa. |
| Fyfe, Albert | Harriston. |
| French, Augustine | North Glanford. |
| Gale, H. E | Ormstown, Que. |
| Gemmell, F. A | Stratford, Ont. |
| Gemmell, John | Lanark. |
| Gamble, J. P | Cumberland. |
| Holtermann, R. F | Brantford. |
| Hall, Samuel | Pine Orchard. |
| Hall, J. B | Woodstock |
| Heise, D. W | Bethesda. |
| Harris, Geo | Dungannon. |
| Hughes, H. N | Barrie. |
| Holmes, M. B | Athens. |
| Hoshal, A. E | Peamsville. |
| Johnston, Thos. E | North Gower. |
| Kirby, W. H | Oshawa. |
| Kelly, Chas | Cathcart. |
| Lowey, R | Woodrows. |
| Lemieux, P. E. (Dr.) | Etchemin, Que. |
| Lepper, M | Picton. |
| Lush, N | Peterborough. |
| McEvoy, Wm | Woodburn. |
| McLaughlin, Alex | Cumberland. |
| Miller, F. J | 223 Dundas St., London |
| McKnight, R | Owen Sound. |
| Morrison, I | Dunvegan. |
| McMillan, H. R | Lochiel. |
| Morrison, R. A | Inverary. |
| Overholt, Israel | South Cayuga. |
| Picket, Abner | Nassagaweya. |
| Post, C. W | Trenton. |
| Pettit, S. T | Belmont. |
| Pierie, Jno | Drumquin. |
| Pierce, Moses | Brinsley. |
| Robison, Wm | Lancaster. |
| Robinson, G. E | Hatchley. |
| Roach, R. W | Little Britain. |
| Readman, Isaiah | Little Britain. |
| Reaman, Josiah | Carrville. |
| Sloan, W. H | Milford. |
| St. Johns, Wm | St. Raphaels. |
| Stanford, Geo. H | Hamilton. |
| Shaver, J. H | Cainsville. |
| Spaeling, J. W | Newmanville. |
| Smith, R. H | St. Thomas. |
| Switzer, J. F | Streetsville. |
| Sibbald, H | Cooksville. |
| Shultz, H. A | Clontarf. |
| Shaw, James | Kemble. |
| Sager, Levi A | Deseronto. |
| Shantz, Aaron | Haysville. |
| Thompson, A. Alfred | Stamford. |
| Thomas, Joshua | Dracon. |
| Vernon, M. W | Newmarket. |
| Whitesides, R. F | Little Britain. |
| Wisner, Isaac G | South Cayuga. |
| Wood, Geo | Erasmus. |
| Walton, W. S | Scarborough Jct. |
| Wells, W. C | Phillipston, Hastings Co. |
| Wood, Samuel | Nottawa. |
| Wrightson, Joseph | Willow Creek. |
| Young, Aaron | Trenton. |

## FINANCIAL STATEMENT.

Abstract statement of receipts and expenditure of Ontario Bee-keepers' Association to December 9th, 1896.

| Receipts. | | Expenditure. | |
|---|---|---|---|
| Membership fees | $159 00 | Balance due treasurer from last audit | $17 05 |
| Affiliated society fees | 60 00 | Grant to affiliated societies | 200 00 |
| Legislative grant | 500 00 | " Industrial Exhibition | 25 00 |
| | | " Western Fair | 10 00 |
| | | Directors' and officers' travelling expenses and board allowance | 143 96 |
| | | Revising legislative and executive committees' expenses | 52 25 |
| | | Printing, postage and stationery | 30 70 |
| | | Secretary's salary | 50 00 |
| | | Treasurer's salary | 25 00 |
| | | Stenographic report last annual meeting | 10 00 |
| | | Periodicals to members | 92 95 |
| | | Auditors' expenses | 4 00 |
| | | Sundries | 1 92 |
| | | | $662 83 |
| | | Balance on hand | 56 17 |
| Total | $719 00 | Total | $719 00 |

We, the undersigned auditors, have examined the accounts and vouchers, as per above account, and report all correct.

J. D. Evans, D. W. Heise, } Auditors.

Toronto, December 9th, 1896.

# SEVENTEENTH ANNUAL MEETING

OF THE

# ONTARIO BEE-KEEPERS' ASSOCIATION.

The seventeenth annual meeting of the Ontario Bee-keepers' Association was held in the Council Chamber of the City Hall at the city of Toronto on December 8th, 9th and 10th, 1896.

The President, Mr. R. F. HOLTERMANN called the meeting to order at two o'clock, p m.

The Secretary, Mr. WM. COUSE, read the minutes of the last annual meeting which were confirmed.

Mr. HOLTERMANN : I am much pleased to be able to tell you that we have the Hon. Mr. Fisher, the Dominion Minister of Agriculture, with us. I am sure you will all bear me out in the statement that we are very much pleased to have the Dominion Minister of Agriculture for the first time at our meetings. I now introduce the Hon. Mr. Fisher, and will ask him to say a few words to us.

## ADDRESS BY THE DOMINION MINISTER OF AGRICULTURE.

Hon. SYDNEY E. FISHER : I responded to the invitation of Mr. Holtermann to come here this afternoon because I was anxious to meet those who were interested in this branch of agriculture. I think I may call it a branch of agriculture, although perhaps very few would be disposed to consider it such. I am on my way, as Mr. Holtermann said, to attend the meeting at Guelph of the stock men of the Province of Ontario, and I suppose, perhaps, I might also consider you, gentlemen, as another branch of stock-keepers, although bees, perhaps, are hardly included in the general term of stock.

They are, however, an important industry, and from what I have read I can quite understand that they may be made still more important. I must tell you frankly, however, that I know very little about bees or bee-keeping. I am not myself a bee-keeper, and anything I know about them is simply the little I have learned from reading, seeing some of your exhibits at the different exhibitions, and enjoying some of the sweets of the industry.

Mr. Holtermann has been to see me once or twice, and has talked to me as to what might be done to aid and encourage bee-keeping and the industry in this country. I have been very much interested, indeed, with what he has laid before me, but from what I must confess to be my lack of knowledge and experience I cannot pretend to have come to any conclusions at all. I feel I must leave it till such time as you are prepared to lay before me some suggestions as to what might be within the scope of the Minister of Agriculture of the Dominion to aid and assist your particular industry. I confess I am

not in a position to advise you. I am not in a position to elaborate any scheme which might aid you, but I shall be very glad indeed to receive any suggestions from you and any information which might lead me to see what would be of assistance to you. The duty of the Minister of Agriculture I conceive to be to try and take an interest in and aid and assist every industry which is connected with the tilling of the soil of the country. The actual keeping of bees, perhaps, is not connected with the tilling of the soil of the country, but you are by the keeping of bees making use of the fruits of certain products of our land, and therefore you are intimately connected with the agriculture of the country. If our crude crops can be turned into something of value at not too great an expense—something of small bulk and at the same time comparatively great value, I conceive it to be one of the best parts of our industry of agriculture. Just as the turning of crops into butter or into cheese is a high development in farming, so I believe turning the sweets of our clover and our various flowers in the country into honey is the development of a higher class of agricultural industry; and this being the case, I feel I ought to take an interest in it and encourage its study so that the people may not only improve the industry, but themselves. I believe it is one of the essentials of the agriculture of this country that our people should not simply be the drudges who have to till the soil and work out the crude products of the soil, but that they should also be the manufacturers of those crude products by turning them into the most compact and highly valuable products that they can possibly make of them. By doing this they show their skill, they improve their own individual capacities, and I think benefit our country in just so far as they succeed and progress in this direction. I trust, Mr. President, you will allow the proceedings of this afternoon to go on, and I may be able to learn a little in the short time at my disposal. (Applause.)

Mr. J. D. Evans: We are glad to have the Hon. Mr. Fisher with us. We all realize how difficult it is for him to get away from his pressing duties to be with us, and therefore we are the more thankful that he has thought it worth while to come and see the bee-keepers. Although not very numerous, we represent a vast amount of sweetness and an unlimited amount of sting. I think about all we can ask from the Government is that they will endeavor to keep us honest. We simply go there for Pure Honey Bills that we may persuade the people of this country that every pound of honey is pure. We have to thank the different Governments and Parliaments for what they have done for us; we are thankful for the Bill that has been given us with regard to spraying trees. We have had from the Parliament the Pure Honey Bill. I have therefore great pleasure in moving a hearty vote of thanks to the Hon. Mr. Fisher for his presence here to-day.

Rev. W. F. Clarke: I have much pleasure in seconding the motion.

The President put the motion, which was carried amid applause.

Mr. Fisher acknowledged the vote of thanks.

## IN MEMORIAM—ALLEN PRINGLE.

Moved by Mr. B. Holmes, seconded by Mr. J. K. Darling, "That, whereas the Ontario Bee keepers' Association has, since last meeting in convention, lost an honored and respected officer by the death of Allen Pringle, of Selby; and whereas, the organization of this Association and its incorporation by Act of Parliament was in a very considerable measure due to his clever assistance and shrewd management; and whereas, during the many years in which he has served in an official capacity (occupying at times the highest posts of honor in the gift of the Association), he has, by his genial and friendly manner, won the love of all who knew him, while at the same time his mature judgment and keen foresight in matters pertaining to our industry has commanded respect, even to those who in some points differed with him, they being unconsciously drawn towards him; and whereas the bee-keeping world bow their heads in sorrow at the announcement of his death, therefore be it resolved that the Ontario Bee-keepers' Association take this.

the first opportunity of giving a united expression of regret that we shall see Allen Pringle no more in our assemblies, nor feel the warm grasp of his hand in friendly greeting again on the shores of time; and that we, his colleagues, extend to the widow and family of our late friend and co-worker our heartfelt sympathy and condolence in this their great trial, and trust that through the blinding mist of tears they may be able to see the hand of the Great Architect of the Universe, and to hear His sweet voice saying, 'Fear not, I will never leave thee nor forsake thee.' And be it further resolved that this resolution be recorded in the minutes and an engrossed copy signed by the President and Secretary be sent to the widow of the late Allen Pringle." Carried by a rising vote.

## QUESTIONS.

Mr. PETTIT: Is it advisable and proper to have supers in two parts or in one? I mean a super sufficiently large to cover the top of the hive? It is the practice of some bee-keepers to have it in two parts; it is also a general practice to have it in one part—of course tiering up as occasion may require. I believe this question of having the super in two parts is not a very old one.

Mr. F. A. GEMMELL: I can't say that I have tried the two part supers very extensively. Mr. Hall has been in the habit of putting a small piece of board at each end of the super. The bees generally start to work at the side of the super nearest the brood nest. You can by this means get your sections better filled in starting. I can't say that I would advocate using them altogether, but in the fore part of the season, my experience has been that it is better to use them; you get the bees to work earlier, and you can by means of reversing them and turning the inside to the outside, get the sections in the corners better filled. There is this trouble, when you go to tier up you have two cases to deal with instead of one.

Mr. MCKNIGHT: I think the two part super is only used to a very limited extent. In order to divert your attention from the super to some other subject, I would ask this question: Why is it that an old queen lays more drone eggs than a young queen? And does a queen ever deposit drone eggs in worker cells? If so, how do you account for it?

Mr. PETTIT: In regard to the remarks make by Mr. Gemmell, it seems to me that the bees are not prepared for the super; that is to say, the honey may be present but the bees are too weak, and it is no use attempting to do very much with weak hives. Right in the start, let us get double the quantity of bees and we will get more comb honey and better finished sections. With regard to the bees filling the outside and the corners, and the necessity for turning the super around, I confess the time was when I was a good deal puzzled myself how to get the work done in a satisfactory manner, but I have a way now that works to my own satisfaction, and I think if my brother bee-keepers will follow me patiently and try the plan I shall try to make clear to them, they will find an improvement over the two small supers and also over the old way. Bear in mind, first of all, that you must have your stocks strong; that is an important point. Having the bees strong and the honey flow on hand, I raise the front part of the hive about an inch higher than the ordinary entrance which is three-eighths of an inch. The honey season begins, the warm weather sets in and the two operate in such a way as to create what we call the swarming fever. We all know if we give the bees plenty of air, it has the effect of holding back that swarming fever. Now, I raise the front end of the hive. When I first started, I simply used a square block about an inch square under the front corners which gave plenty of ventilation, but there were losses connected with it because when swarming came on the queen would be liable to run out at the side, drop down on the grass and be lost and you would be a long time finding her, but by raising the front end of the hive so that it compels the queen to go out at the entrance, you know where to look for her. I will show you how I raise the hive: I have two wedges the length of the hive and about an inch square at one end and at the other end running down to a feather edge. I raise up the front end of the hive and slip one of these wedges under each

side, that closes up the side ; this compels the queen to go out at the entrance and it gives the bees that come in climbers to go to the sides. Ordinarily the bees enter the entrance at pretty nearly the centre, and the frames being low, they catch and go right up and fill the centre of the super while the outsides and corners are only partially filled. If the hive is so raised that the bees on coming in do not so readily catch on and go up, but get the habit of going to this side and that side the point gained is that they fill the supers at the outside just as readily as the centre. That is a point worth recollecting and worth while trying. I have experimented on it for a number of years till I am satisfied there is a great deal in it. I am not going to say there may not be possible advantages in having two supers, but for me, that system would be inconvenient. I did not like it at all ; I had too much traps around and too much tinkering to do. By my system, the bees seem to manage the whole finishing up process thing themselves. There is another very important feature in my system but I will not describe it just now.

Mr. McEvoy : You may have the bees as strong as you please, but where there are only the starters it is so high for the bees to reach that they do not catch and run up like they do where the sections are filled with foundation.

Mr. Petitt : I fill the sections with foundation.

Mr. McEvoy : It pays to fill the sections full. Mr. Gemmell spoke about Mr. Hall putting on these supers. It is a short box he puts on, and if the bees are not very strong they will take possession of the smaller space, but if you give them a larger space, they do not make as good a job.

Mr. Shaver : Will Mr. Pettit's supers be level when he puts his wedges under?

Mr. Pettit : They may if I choose to have them so. I like to have them very nearly level. When I set my hive out in the spring, I set the rear part of the hive about an inch higher than the front, and when I put in the wedges it brings it very nearly level. It is not absolutely necessary to have the front and rear ends of the hive exactly level, but they should be level the other way. After the discussion on this question was ended, Mr. McKnight's question was taken up.

Mr. Gemmell : There is one way you can find out that the old queen will lay more drone eggs than the young queen. If you are working for comb honey, hive your bees on starters and you will find the frames filled with drone comb. If you hive a swarm with a young queen on say five starters you will get very little drone comb. You can take and hive them with an old queen under the same circumstances and you will find a great deal more drone comb, and you will find eggs in every bit of it. Is it the bees that are the cause of this drone comb being built? Do they see that the old queen is failing and that they require more drones in order to fertilize the young queens?

Mr. Evans : Might not the reason be that as the queen is only impregnated once in her lifetime, and to produce drones it requires nothing of that kind, that when the effect of such impregnation is dying out she becomes incapable of laying worker eggs and lays drone eggs without fertilization?

Mr. McEvoy : There is a way out of it. Don't keep queens beyond two years, as a rule, and in all cases fill the sections full of foundation.

Mr. McKnight : Why do you advise not keeping the queens longer than two years?

Mr. McEvoy : The summer the queen is raised she is pretty good, in the next year she is in her prime, and after that she often lays very well, too, but as a rule she is not so good ; you don't get so many bees, you don't get so much honey and you get less money. It pays to do away with them in two years. It paid me.

Mr. Pettit : What would you think of advising a man who has good cows to butcher them off when they are in their prime. I am free to admit there are queens in every apiary that ought to be turned over to the butcher, but there are others that, in my opinion, it would simply be a shame to do it with. This year, when I started out I hadn't a very large apiary—only sixty hives—and I found only five young queens, all the rest were more than one year old ; I kept a record of them and quite a number, I can't give the exact proportion, were two years old and a number three years old and quite a sprinkling of them four

years old, and I don't believe there is a bee-keeper present that has obtained more comb honey, according to the number of hives, and better filled sections and more complete work than I got from those old queens.

Mr. GEMMELL: That doesn't prove anything because the locality may have everything to do with the difference.

Mr. PETTIT: I live in a locality where there are lots of bee-keepers all around and they have the same privileges.

Mr. GEMMELL: Do you know for a fact whether the management the other bee-keepers gave their bees was the same as you gave yours in the spring? Do you think they had their colonies in just as good condition? Did they come out of winter quarters in just as good condition?

Mr PETTIT: I would not like to press the point that the advantage I gained was by the old queens. But, I would like to press the point that there are queens two, three and four years old that are equally as good as young queens.

Mr. MCEVOY: There is many a good horse at seventeen, many a good man at seventy, but there are more good horses at seven than seventeen, and more good men at forty than seventy. I have had good queens at three years old, but I have been tricked so often in the spring that I take no chances.

Mr DARLING: I might answer Mr. McKnight's question by asking another: Why is it that poultrymen find that their old hens are the best clockers? I think there is a scientific reason for it: they are getting old and there must be something to take their place or soon the variety would run out. I believe what Mr. Pettit has said is correct, but it is also the fact, as Mr. McEvoy has said, that after two years queens begin to fail, and as a general rule fail rapidly. I have had good queens at three years old. I do not know that I have had what I would call a good queen at four, while it is possible for a queen to live five years. I have tried old queens so many times that I have about come to Mr. McEvoy's conclusion, that a person is not safe in keeping them over two years. I think the reason why an old queen deposits more drone eggs than the young queen is mainly because she is failing, but I think there are perhaps two reasons: there is the one spoken of by Mr. Evans, that fertilization has failed, partly. It has been admitted for some time that if a person wishes to have worker comb built he puts in a young queen.

Mr. HEISE: How does Mr Darling know that the queen, when she is failing, will deposit a drone egg in a worker's cell?

Mr. DARLING: I have had it time after time.

Mr. MCEVOY: So have I.

Mr. MCKNIGHT: I confess I have not gotten very much information yet with reference to the question I put. It is a fact that old queens lay more drone eggs than young queens when they come to a certain stage of their existence, and there is a very good reason for it but in order to comprehend and appreciate that reason one must know something at least of the physiology of the bee. A queen bee, like most female creatures, has in her organization what is known as ovaries, egg vessels, in which the embryo eggs lie; and all the embryo eggs lie there for the opportunity of development during the lifetime of the female; there is a tube reaching down from these ovaries which is scientifically known as the fallopian tube. As has been stated a queen only mates with a drone once in her life time and at the junction of the fallopian tubes in the organization of the bee there is a little sack-like aperture to one side, and when a drone meets with a queen the male principle is deposited in that cell, and there it remains as long as it has any vitality, during the queen's lifetime, or what is left of it. When the queen sends an egg down one of the fallopian tubes she can by the power of her own will either bring it in contact with that male principle or pass it by untouched. Every egg that comes in contact with the male principle becomes impregnated and the result is a worker bee When the queen wishes to deposit drone eggs she passes the egg on without it coming in contact with the male principle, the result is a drone bee. When a

queen gets old and tens of thousands of eggs have passed down these tubes and come in contact with that male principle, it becomes exhausted, its vitality is gone, and the eggs may come in contact with it and not be impregnated with it. That is the reason why old queens lay more drone eggs than young queens. The old queen, following her instinct, whether the egg is impregnated or not, deposits the egg in a worker's cell. That is my reason why an old queen lays more drone eggs than a young queen, and why drone eggs are sometimes deposited in worker cells.

Rev. Mr. CLARKE: I think one of the mistakes of modern bee-keeping is the disposition on the part of bee-keepers to think that their knowledge is better than the instinct of the bee. I think the instinct of the bee teaches her when it is time to supersede an old queen more correctly than we can find out when it is to be done. My experience agrees with Mr. Pettit's in regard to the very great vitality of some queens. I have had queens three and four years of age, as he has said, better than any one year old queen, and yet we have got eminent bee-keepers who make a point of superseding every queen at two years old.

Mr. Hutchinson, of Michigan, every year sells a batch of two-year old queens because he wants to put in younger ones.

Mr. GEMMELL: Are not the queens that he sells only one year old? He gets queens from the south in the spring, and sells them at one year old.

Rev. Mr. CLARKE: It is the queen's second year of service. He sells those queens just when they may nicely be expected to be entering upon their best stage of usefulness—that is the point; I don't care how old they are. He sells them and subjects them to all the check that there is by shipping; after they have been sold and shipped they are not anything like so good as when he shipped them, because they have had a very great check.

Mr. GEMMELL: I would like to correct Mr. Clarke in regard to the queens. The reason Mr. Hutchinson gets those queens from the south in the spring is because he hives his swarms on starters, and with a young queen he gets less drone comb; another reason is he does not get nearly so much swarming with the young queens: that is his object in getting rid of the old queens.

## REPORT OF COMMITTEE ON BY-LAWS.

The committee appointed to revise the by laws of the Association presented this report which upon amendment was adopted.

(For by-laws see page 47).

## REPORT OF COMMITTEE ON HONEY LEGISLATION

This report was presented and read by Mr. S. T. Pettit, chairman of the committee, and referred back for the purpose of striking out certain objectionable clauses contained therein.

## PRESIDENT'S ADDRESS.

By R. F. HOLTERMANN, BRANTFORD.

A presidential address is generally brief, but there is so much of importance to be said to those who make bee-keeping a calling, and it is gentlemen of this class, to a large extent, which comprise the membership of the Ontario Bee-keepers' Association, the largest and most influential organization of its kind in the Dominion, that I cannot resist the temptation to occupy your attention for some time.

The recognition of the dignity and importance of a calling is largely dependant upon what those who engage in it make of it. Some are still looking upon bee-keeping in the same manner in which it was regarded in the dark ages; they concede that the natural history of the bee is a fascinating study; that the honey is an article of food for the table of the gods, and occasionally for ordinary mortals. If these people keep bees they do so in the old-fashioned way which does not consider that care, skill and experience are necessary factors in success. The great all absorbing question with them is, shall luck be with or against us? Then there are those who are adopting modern methods and modern appliances. By this I mean the movable frame hive, the honey extractor, and similar improvements, but who forget to arm themselves with the information necessary to the use of those appliances to the best advantage.

Many more, in fact the majority of our bee-keepers, are resting peacefully, content with the information which they at present possess. True, very few think they know all about the management of bees, but they consider it impossible to solve questions of this nature, and, with very few exceptions, they fold their hands in silent inactivity content to grope their way in comparative darkness when with a little exertion valuable light may be thrown on their pathway.

Ladies and gentlemen, as we draw aside the veil of the future it is no Utopian dream to see in the future of bee-keeping advancement far exceeding that which the past has brought forth. The hastening of this time rests largely upon the wider recognition of its possibilities and upon our showing by aggressive work our faith in them. Some will claim that honey should form as important and extensive an article of food as butter and cheese, and further, that it is only the lack of education, the need of having the attention of the public drawn to honey, which prevents it being used three times a day upon the tables of the various homes of our Dominion. There is no doubt but that if the attention of manufacturers of such articles as confectionery, vinegar, liquors and tobacco were drawn to the usefulness of honey it would lead to a hundred-fold increase in consumption.

Dairying in Canada not many years was looked upon as insignificant, meriting no great support, and with no future of consequence before it. As dairymen have triumphed so may we, if we only grasp the situation and work with the determination of the pioneers of advanced dairying. While all may not agree with this, we are at least safe in saying that bee-keeping might take a very prominent position and become a very important branch of agriculture.

What has been done during the last ten or twenty years in almost every branch of agriculture requiring intelligence, energy, application, and hope, could have been done, and can yet be done, for bee-keeping. Neither we nor the people have been alive to the necessities and importance of the profession. If we have not storage problems to solve we have others of as great importance.

Ontario is at present the banner producing province of the Dominion. Some will attribute this to greater enterprise on the part of its inhabitants, others to nature having been more lavish in her gifts, while still another class will attribute this to accident merely. But the important question for us to decide is, what can be done for bee-keeping? and it is necessary that we consider the indications that point to its being an industry which is capable of development in our country, and further, that we urge the importance of being "up and doing."

Bee-keeping in Ontario (and my remarks apply to many other parts of the Dominion) is an industry for which our country is naturally adapted; the farther north you go the better the quality of honey obtained, provided that blossoms will distil nectar in sufficiently large quantities to pay the bee-keeper. I am not asking you nor the world to take the statement of the Association in this matter, but I ask you to examine the statement of disinterested judges and record of Ontario honey where it has been exhibited side by side with honey from other parts of the world.

We have chosen a profession in which the gates to success can only be opened by intelligence, experience and judicious application, and we in this respect have chosen

wisely, leaving the fields of keener competition to countries less fortunate than ourselves in this respect. Again, ours is a profession that creates wealth. The honey crop displaces no other crop on the farm, and further, the primary object of the existence of the honey-bee is not to gather honey, but to assist by the distribution of pollen the cross-fertilization of plant life; the honey-bee is of the greatest value to the fruit-grower, and all that bee-keepers ask in return from the fruit-grower is a little nectar from the flowers in his orchard and field, and the firm and kindly grasp of his hand acknowledging the common interests and common benefits. I have not spoken thus far of the great, and at present economic, value of honey as a food. This is generally conceded and attested to by holy writ. At the present price honey is no longer a luxury, but is accessable to all. The possibility to development lies in various directions. When we consider the chances of bee-keeping growing in importance, and we have as a guide the example of countries by nature, and in some cases by cultivation, less richly endowed than our own. Take Germany, for instance, the last statistics give the number of colonies kept as 1,910,000; the annual production of honey 44,800,000 pounds; Spain, 1,090,000 colonies, and annual production of honey 42,500,000 pounds; France, 950,000 colonies, and the annual production 22,500,000 pounds, and European production of honey 35,000,000 tons, wax 15,000,000 pounds, and yet we find such countries as Britain, Germany and France importing honey from the North American continent. We know that England imports a large quantity of honey, as we have very strong evidence that those who have tried the American product prefer it to all others, except their own production. I might also add the English market is favorably disposed to the Canadian product. A year ago, in response to an invitation, the Goold, Shapley & Muir Company, Limited, of Brantford, sent a sample of comb and extracted honey to the Imperial Institute, England. Mr. Watson, the Canadian curator, suggested that the company send a larger exhibit. Among other remarks he writes: "I conclude that you have a large supply and can ship regularly." The company sent another exhibit with packages which could be distributed among interested parties. As president of this Association I consider it my duty to advance in every way the interests of its members, and with that object in view I induced the company to supply the goods in packages, and prevailed upon the Ontario Government to pay the freight, and now there is an exhibit of honey at the Imperial Institute with the labels of the Ontario Bee-keepers' Association upon the packages. In connection with the exhibit is a list of the members of the Association with their post-office address. British extracted honey is frequently quoted in the British Bee Journal as high as thirteen cents per pound in bulk. Bee-keepers in this country will be satisfied if they can net seven cents per pound for their entire crop. There appears to be a reasonable prospect, if we can supply Great Britain with Canadian honey during the greater part of the year at least, that more than that sum can be realized. Many parts of our Dominion never see honey, and even in this city in which we are at the present gathered, 200 pounds could to advantage be consumed where one is used to-day. How few of the restaurants, lunch counters and hotels have honey on their bill of fare. How few even use it rarely, and yet I know of one firm in this city which last fall purchased 135 twelve section cases for their lunch counter. Concerning wax, I know of one firm in the province of Quebec willing to place an order for 1,000 pounds of beeswax a month, a quantity this country is at present unable to supply. But we must not dwell too long upon this side of the question, inviting as it is and open as the field is for cultivation. Let us next look upon what can be done to improve the quality of honey and decrease the cost of production.

Some of us can indicate possibilities in this direction, but even to the most advanced and the most farseeing the future is vague; only the prophet can foretell the details of the future. As to quality, Canadian honey is generally pure. In the few cases where adulteration has taken place, it has, I feel satisfied, almost always been done by the dealer. Seeing that the Government was going to put the Adulteration Act into force in respect to vinegar, I urged that the same should be done with honey. I found the Department of Inland Revenue, with Sir Henri Joly de Lotbinière as Minister, very anxious to respond to our wishes, and between 100 and 200 samples of honey have been

collected from many directions and are now being tested by that Department. This work will be actively carried out in the future, and the public may rest assured that there will be no difficulty in securing pure honey.

Next, as to quality: During my visit to Ottawa in connection with this matter, the specific gravity or ripeness of honey was touched upon, or, as the chemist would put it, we considered the percentage of sacharine matter. I thought it well that the public attention should in an official way be drawn to the difference in honey in this respect. The Government promised to do this: they also have it in their power to pass an Order-in-Council calling for a certain percentage of sacharine matter in honey. Sir Henri Joly de Lotbinière, with whose department this matter largely rests, promised to act in this direction, and at our request very kindly consented to send to our convention Mr. Thos. McFarlane, F. R. S C., chief analyst of the Department, and that gentleman is with us and awaits our decision. Such an Act, provided a judicious decision as to percentage of sacharine matter was arrived at by Mr. McFarlane, would be of great value to bee-keepers as well as to the consumers of honey. During the past year we have secured, through the efforts of S. T. Pettit and our Association, an amendment of the Adulteration Act, which established a principle and throws additional safeguards about the standard of quality in honey.

As to the questions concerning the cheapening of the production of honey: Better methods of wintering which will tend to bring colonies through the winter not only alive, but with the loss of vitality reduced to a minimum, is a problem few, if any, have yet mastered. To reduce swarming and keep worker forces together more in the future than in the past is also an important point for investigation. Comb foundation with the number of square feet per pound reduced without weakening the foundation beyond the point where it will not sag or break, and if possible a thinner base and higher side wall would enter greatly into the reduction of cost in production.

During the past year the Ontario Government's Experimental Apiary, among other work, made a careful test as to the likelihood of transmitting through foundation the spores of the disease known as foul brood (*bacillus alvei*). Soft wax of excellent quality was taken, and Mr. F. C. Harrison, B S. A., bacteriologist at the Ontario Agricultural College, injected infected spores into the wax Foundation was made from this, barely bringing the wax to the melting point in the process. This foundation was given to bees on the 8th of June. The queen began laying June 11th. Mr. McEvoy, the bee inspector for the Government, examined these bees on the 17th of August and later in October, and found them entirely free from disease. Mr. Harrison has done some valuable work in the laboratory, his investigations all being brought before the Ontario Agricultural and Experimental Union, and while he has done much, a great deal more is required to be done.

After careful investigation, it appears to me that this Association might draw attention to a fruitful cause of the spread of this disease, and that is through honey. This disease may exist in almost any apiary without the knowledge of the bee-keeper, and for this reason it becomes dangerous to feed honey when the bees are short of sufficient stores. Next, it would be well if the foul brood inspector could visit every county bee-keepers' association in the Province and there give the symptoms and treatment of foul brood, illustrating his lecture by a specimen. The meetings might be arranged in regular order, to avoid unnecessary travelling expenses. Again, it might be well to make an effort to pass a foul brood Act in the remaining portions of the Dominion, and we would then be able to secure the same protection that is given to protect the Dominion from the liability of infection from stock imported from countries not having the same safeguards.

Some of these questions may engage your attention with profit. I earnestly hope that the organization may receive increased attention from bee-keepers. It has, during its comparative childhood, been the means of giving legislation of value, and has carried on useful work in other directions; and as we reach maturer years and obtain greater discretion, and attain to greater activity, and receiving, as I hope we shall, an increased

Government grant, we will have opened up greater avenues of usefulness and will assume greater responsibility.

Mr. GEMMELL moved, seconded by Mr. BEST, that a hearty vote of thanks be tendered to the President for his able and interesting address Carried amid applause.

The President introduced Mr. T. Macfarlane, chief analyst of the Inland Revenue Department at Ottawa, to whom, he said, they were indebted for pointing out the clause in the Act which gave power to pass an Order-in-Council.

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## THE AROMA IN HONEY.

Mr. MACFARLANE: Mr. President and Gentlemen,—In the proceedings of any society with which I have had anything to do, the President's address is usually received with gratitude, and is not exposed to any criticism at all. And it may possibly be the case (I don't know whether it is the case or not) that that should be done here It is not usually the practice to look a gift horse in the mouth, and the President's address usually passes without discussion, but as discussion is permitted in this case, I would just like to say a word or two with regard to the thoughts that have occurred to me while the President was reading his address.

Of course the object of the address and the object of the meeting is, as far as possible, to gain a wider market and get better prices for the product. In what I have to say, I may make mistakes common to those who have no practical acquaintance with the production of honey. In this case you have only to check me and tell me when I am wrong. But it occurred to me that we might liken honey to other articles of commerce —say tea Tea is tested by the tea tester in a very different way from the chemist; he has his own way of testing, and he puts a very great deal of value on what he calls the aroma, and that is a subject which we cannot handle chemically; it is not an article that we can weigh as we do other constituents. In the same way you have got wine testers, who value a wine not exactly with regard to the ponderable or weighable constituents of the wine, but with regard to how it smells, what the taste is and what the flavor is. It seems to me that honey can be very reasonably compared to these two articles—tea and wine, for you have in honey the same substance, the same constituent which the chemist cannot tell you anything about, and which the chemist in his analysis would not be able to tell anything about or make any report upon—that smell, that bouquet, that aroma, which is derived from the flowers upon which the bee feeds. And it seems to me if you want to get a higher price for the product, you must do just as tea producers and wine manufacturers do, you must get into it these superlative qualities that the chemist cannot detect, but that the connoisseur can detect, and that he values highly.

If that is the case, then it seems to me that you have to look as far as possible in the direction of providing the bees with that food which will be capable of giving to the honey the particular aroma that you seek after.

Is it not, then, the sole thing to be able to feed the bee with sugar in that condition, or accompanied by these other constituents that give to honey its value? If you cannot get these other constituents into the honey, I don't suppose you can ask a higher price for it than syrup. You can get sweetness easily into syrup that resembles honey, but you cannot get the particular flavors without which honey is not constituted, as it were.

I had some conversation with Mr. Clarke before leaving the meeting this afternoon, and I think I misunderstood him when he first made a statement with regard to the identity of certain sugars, and it may be that he is quite correct in maintaining that sugar contained in the nectar of flowers is the same as that which is contained in sugar cane. But then, even although that is so, that is not a matter of practical consequence, because sugar is not merely the food that bees will take, but it is sugar accompanied by certain other qualities, and these you can only get in the

sugar that exists in the nectar of flowers. If you simply supply the bees with sugar, they will give you sugar without those qualities you so very much want. The President has said that seven cents is the value, and possibly before it got to the retailer you would have to get ten cents for the honey sold by the retailer. That comes into competition with ordinary syrups, which are sold at a much lower figure, and unless you can get the peculiar qualities infused into the honey, I don't suppose you can expect the extra price. I have much pleasure in joining the gentlemen who proposed and seconded a vote of thanks to you, Mr. President, for your interesting address.

## AN OUTSIDE MARKET FOR HONEY.

By R. McKnight, Owen Sound.

Mr. McKnight: I think it is a matter of congratulation with all of us that we have a gentleman here from Ottawa, Mr. Macfarlane, who is in a position to give us some advice from a scientific standpoint, and who has a warm interest in the prosperity of the bee-keepers. There are a number of questions touched upon by the President in his address which are worthy of the consideration of this Association One of them is the extended market for the product of the bee-keepers of Ontario; another is the purity of the article and its exceptionally fine quality when put upon the market. I am not very sure that Mr. Macfarlane is right in believing, if he does believe, that it is within the power of the bee-keeper to secure for honey those essential properties that he says ought to be contained in it, and that he says rightly and justly should be contained in it. He tells you that there is at least one—if not more than one—property in honey that is not tangible, and that the chemist cannot lay hold upon, and that is its aroma. The bee-keeper has no power to impart to the honey that desirable aroma. As I understand it, that is the product of the flower, and the aroma of the honey will correspond with the aroma of the flower from which it is gathered. I presume that Mr. Macfarlane meant by his remarks that bee-keepers might perhaps cultivate, or cause to be cultivated, or use their influence to cause to be cultivated, those flowers that give to honey that desirable aroma and these desirable properties. In practice I don't think that is very easily attained. I am not going to discuss the address at all, but there is another point I would like to advert to for a moment, and that is the desirability of finding an outside market for the work of the bee-keepers of Ontario. My own candid belief is that there is ample room within our own Province to dispose of all the honey that we can produce, and to dispose of it at a price as good as can be obtained elsewhere. If that be so, it is not necessary to push the foreign market to any great extent. He refers to the price of honey in Britain. Those of you who have watched the price of honey in England, and Britain generally, will have noticed that in the last ten years the price of honey there has varied very little, indeed. I believe the time has come when, if the Ontario bee-keepers have honey they cannot dispose of here at current rates—the President says seven cents (I never sold it at that in my life)—they can ship it to the old country and realize that much and a little more; and I believe there was no time between now and ten years ago when very much more could have been secured for it. Some of our friends advocated the cultivation of that market even at that distant period (ten years ago), when we were getting twelve and a half and sometimes fifteen cents; when, I felt sure then, and I feel sure still, not more than eight cents could have been realized on the whole in Britain. I have visited a good many of the British cities and inquired as to the price of honey; I have been in Lewis & Co's store in Liverpool, one of the largest stores in England, and the salesman brought me American honey in two pound tin packages that he told me he bought for four pence a pound ten years ago. I was in Glasgow, in Edinburgh, in Manchester and in Belfast, and I found the same thing everywhere. When British honey was bringing nine pence a pound wholesale, American honey would not realize more than half the price. It is just the same to some extent now. I believe if Canadian honey could be put upon the market as Canadian honey, and the British people

understood it to be Canadian honey and not American, it would in time work up perhaps to the price of English honey, because there is no question about it that it is an article if not superior at least equal to any product of flowers obtained anywhere, except it be heather; and the honey obtained from no plant can compare for a moment with heather; it is a unique article.

Mr. PETTIT: I was very much pleased indeed with the remarks of Prof. Macfarlane with regard to value being added to the food product through, or by means of, the flavor or aroma. It is a fact, and he emphasizes it, that we should see to it that our honey has that desirable quality in the highest degree of perfection. I think Mr. Knight erred a little in his statement that we had not any choice in the matter, or could effect nothing in that line. First, we recognise the fact that there is a great deal in having the flavor of our honey as the editor of the *British Bee Journal* says. The value consists in the aroma or flavor; we find it in nuts, tea, wine, raisins and in almost everything we can think of. It is the flavor we look at—it is the flavor that gives it value, and I am very glad the point was brought out by our friend. I contend that we can have our honey possess the very highest possible degree of this very valuable quality, or we can deteriorate it, according to the way we handle it. If we take it from the bees too soon before it is evaporated properly, the flavor will be somewhat inferior. When I first started extracting honey I used to take it green and unripe and set it away and allow it to settle, and then skim it and evaporate it, and all that process for the sake of getting more pounds; but later years and more experience taught me that I would get something better by allowing the bees to finish it, and I would get all the exquisite flavors stored up in the honey that the flowers gave to it. If we take it too green from the bees we lose that volatile or essential oil. We all agree that next to honey maple syrup is the best sweet provided by a wise Creator, and some people go a little farther and think maple syrup is better than honey. All of us know, who have made it, that when we bring it to a certain degree of body, weight or consistency the flavor is better; it is finer and it will sell for more money. The flavor is there, the taste is there, and just so with honey.

Mr. MCKNIGHT: I take exception to Mr. Pettit. Be the honey ripe, as we term it, or unripe, I hold that there is no time in honey when it has that aroma so fully as when it is taken from the hive. It is a fleeting property, and the older the honey becomes and the longer it is exposed the less evident will that property be in the honey. What Mr. Pettit says is true, that the proper ripening of the honey is what every bee-keeper should look to and see that it is secured, but the ripening of the honey only secures its specific gravity; it does not increase its aroma, but rather decreases it.

Mr. DARLING: I know, in some instances at least, the sales of some of my honey has been due to the fact that my bees are allowed to ripen the honey, while other parties have sold a greener article. This greener or less ripened honey possesses a pungent flavor which is disagreeable. The riper honey has a rich mellowness that the green honey does not possess.

Mr. BEST: If the honey is not properly capped it has a tendency to sour a little; it will lose quite a bit of that flavor which I claim it would have, provided the bees kept possession of it till it was in its proper condition. I think if we, as a rule, allow it to be perfectly capped we will improve the quality and have a better market for our honey than we will if we are in a hurry to have it extracted.

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## THE DOMINION GOVERNMENT AND BEE-KEEPING.

Moved by Mr. H. N. HUGHES, seconded by A. PICKETT, that after hearing the address of the Hon. S. E. Fisher, Dominion Minister of Agriculture, and his suggestions that the Ontario Bee-keepers' Association express their views as to what should be done by the Dominion Government for bee-keeping, be it resolved that we ask the Dominion Government to render the same assistance to bee-keeping that is being given to other

branches of agriculture. We would respectfully suggest that experiments be conducted in bee-keeping with the object of cheapening the cost of production and improving the general quality of honey put upon the market. Also to assist when opportunity offers in the development of home and foreign markets for honey ; and that the Association would recommend Mr. R. F. Holtermann, of Brantford, to the position of Apiarist at the Dominion Experimental Farm, Ottawa.

After some discussion, the Vice-President, Mr. Darling, put the motion, which was carried.

Mr. HOLTERMANN : I am sure it will not be out of place for me to thank you for the recommendation which you have given me. I think you understand what my views are in regard to the subject of bee-keeping. I think that there is a greater future than most people realize in the direction of the development of the bee-keeping industry.

Moved by Mr. SHAVER, seconded by Mr. BROWN, that the Foul Brood Inspector's report be read. Carried.

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## FOUL BROOD INSPECTOR'S REPORT.

During the past season I visited bee-yards in the counties of Lambton, Huron, Bruce, Grey, Middlesex, Perth, Norfolk, Brant, Wentworth, Lincoln, Halton, Simcoe, Peel, York, Ontario, Carleton, Russell and Prescott. I examined eighty-eight apiaries and found foul brood in forty-one bee-yards. The great outbreak of decaying brood which was found in so many apiaries in June and July caused many bee-keepers to become very much alarmed, and was often mistaken for foul brood. I received many letters from bee-keepers describing the sort of dead brood that they found in their colonies, and also samples of combs with decayed brood in. Sometimes foul brood was mistaken for dead brood of other kinds, until it had made great headway. Every place that I went to I found the bee-keepers anxious for me to examine their apiaries, and pleased when I did so ; and for the very nice way that I have been treated by all the bee-keepers, I here return to them many thanks. I am also pleased to say that those that had the disease in their apiaries did their duty, and that I did not have to burn one colony in 1896.

My time, livery hire, and railway fares amount to $658 85.

WM. McEVOY.

WOODBURN, Dec. 7th, 1896.

Mr. GEMMELL moved, seconded by Mr. SHAVER, that the Foul Brood Inspector's report be received and filed. Carried.

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Mr. FIXTER presented his report on experiments with various brands of foundation.

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EXPERIMENTS WITH VARIOUS BRANDS OF "FOUNDATIONS."—1895-96

| Designating Letter. | Name of wax and mill. | Section. | Milling temperature. | Weight in grammes of "foundation," 2 inches square. | Weight in grammes of empty honey-combs, 2 inches square. | Weight in grammes of wax added by bees per two square inches. | Percentage of wax added by bees. | Gathered from. |
|---|---|---|---|---|---|---|---|---|
| | | | F. | | | | | |
| A. 1.. | Choice wax, root mill | Outer .. | 89° | 1.401 | 2.969 | 1.568 | 111.9 | Clover. |
| A. 2.. | " " | Inner .. | 89° | 1.401 | 3.108 | 1.701 | 121.4 | " |
| | | Outer .. | ..... | 1.401 | 2.655 | 1.254 | 89.5 | |
| | | Inner .. | ..... | 1.401 | 2.735 | 1.334 | 95.2 | |
| B. 1.. | Choice wax, root mill | Outer .. | 120° | 1.204 | 2.968 | 1.764 | 147.3 | Clover. |
| B. 2.. | " " | Inner .. | 120° | 1.204 | 2.906 | 1.702 | 141.3 | " |
| | | Outer .. | ..... | 1.204 | 2.691 | 1.487 | 123.5 | |
| | | Inner .. | ..... | 1.204 | 2.647 | 1.443 | 119.8 | |
| C. 1.. | Foundation in general use, 1894.. | Outer .. | ..... | 1.414 | 2.946 | 1.532 | 108.4 | Clover. |
| C. 2.. | " " | Inner .. | ..... | 1.414 | 2.973 | 1.559 | 110.2 | " |
| D. 1. | Foundation in general use, 1895.. | Outer .. | ..... | 1.215 | 2.655 | 1.440 | 118.5 | Clover. |
| D. 2.. | " " | Inner .. | ..... | 1.215 | 2.588 | 1.373 | 113.0 | " |
| D. 3.. | " " | Outer .. | ..... | 1.215 | 3 278 | 2 043 | 168.1 | Buckwheat. |
| | | Outer .. | ..... | 1.215 | 2 761 | 1.546 | 127.2 | Clover. |
| | | Inner .. | ..... | 1.215 | 2.700 | 1.485 | 122.2 | " |
| E. 1.. | Heavy sheet, root mill | Inner .. | 120° | 1.315 | 2.707 | 1.392 | 105.8 | Clover. |
| E. 2.. | " " | Outer .. | 120° | 1.315 | 2.685 | 1.370 | 104.2 | " |
| | | Outer .. | ..... | 1.315 | 3.062 | 1.747 | 132 8 | |
| | | Inner .. | ..... | 1.315 | 3.069 | 1.754 | 133.3 | |
| F. 1.. | Inferior wax, root mill | Inner .. | 89° | 1.224 | 3 006 | 1.782 | 145.6 | Clover. |
| F. 2.. | " " | Outer .. | 89° | 1.224 | 3.046 | 1 822 | 148.6 | " |
| | | Outer .. | ..... | 1.224 | 2.823 | 1.599 | 130 6 | |
| | | Inner .. | ..... | 1.224 | 2.771 | 1.547 | 126.4 | |
| G. 1.. | Inferior wax, root mill | Inner .. | 129° | 1.167 | 3 024 | 1.857 | 159.1 | Clover. |
| G. 2.. | " " | Outer .. | 120° | 1.167 | 3.028 | 1.861 | 159.4 | " |
| | | Outer . | ..... | 1.167 | 2.664 | 1.497 | 128.3 | |
| | | Inner .. | ..... | 1.167 | 2.666 | 1.499 | 128.4 | |
| H. 1.. | Choice wax, given process | Inner .. | ..... | 1.801 | 3.513 | 1.712 | 95.0 | Clover. |
| H. 2.. | " " | Outer .. | ..... | 1.801 | 3.372 | 1.571 | 87.2 | " |
| | | Outer .. | ..... | 1.801 | 3 538 | 1.737 | 96.4 | |
| | | Inner .. | ..... | 1.801 | 3.567 | 1.766 | 98.0 | |
| I. 1 .. | Poor wax, given process | Inner .. | ..... | 1.582 | 3.176 | 1.594 | 100.8 | Clover. |
| I. 2 .. | " " | Outer .. | ..... | 1.582 | 3.275 | 1.693 | 107.0 | " |
| I. 3 . | " " | Inner .. | ..... | 1.582 | 3.453 | 1.871 | 118.2 | Buckwheat. |
| I. 4 .. | " " | Outer .. | ..... | 1.582 | 3.441 | 1.859 | 117.5 | " |
| | | Outer .. | ..... | 1.582 | 3.740 | 2 158 | 136.4 | |
| | | Inner .. | ..... | 1.582 | 3.771 | 2.189 | 138.4 | |
| J. 1 .. | Patent process, 12 sq ft. per lb. | Inner .. | ..... | 1.004 | 2 515 | 1.511 | 150.5 | Clover. |
| J. 2 .. | " " | Outer .. | ..... | 1.004 | 2.497 | 1.493 | 148.7 | " |
| J. 3 .. | " " | Inner .. | ..... | 1.004 | 3.406 | 2 402 | 239.2 | Buckwheat. |
| J. 4 .. | " " | Outer .. | ..... | 1.004 | 3.360 | 2.356 | 234.6 | " |
| | | Outer .. | ..... | 1.004 | 3.193 | 2.189 | 218.0 | |
| | | Inner .. | ..... | 1.004 | 3.311 | 2.307 | 229.7 | |
| K. 1.. | Patent process, 15 sq. ft. per lb. | Inner .. | ..... | 1.093 | 2.818 | 1.725 | 157.8 | Clover. |
| K. 2.. | " " | Outer .. | ..... | 1.093 | 2.757 | 1.666 | 152 4 | " |
| K. 3.. | " " | Inner .. | ..... | 1.093 | 3.355 | 2.262 | 207.0 | Buckwheat. |
| K. 4.. | " " | Outer .. | ..... | 1.093 | 3.091 | 1 998 | 182.5 | " |
| | | Outer .. | ..... | 1.093 | 3.515 | 2.422 | 221.6 | |
| | | Inner .. | ..... | 1.093 | 3.329 | 2.236 | 204.6 | |
| L. 1.. | Foundation sent by R.F.H., 1895 | Inner .. | ..... | 1.257 | 3.495 | 2.238 | 178 0 | Clover. |
| L. 2.. | " " | Outer .. | ..... | 1.257 | 3.016 | 1.759 | 139 9 | " |
| | | Outer .. | ..... | 1.257 | 2.792 | 1.535 | 122 1 | |
| | | Inner . | ..... | 1.257 | 2.875 | 1.618 | 128.7 | |

Mr. SPARLING moved, seconded by Mr. SHAVER, that the result of the report as handed in by Mr. Fixter be embodied in the Annual Report. Carried.

## LEGISLATION REGARDING THE ADULTERATION OF HONEY.

BY J. MACFARLANE, ANALYST, INLAND REVENUE DEPARTMENT, OTTAWA.

I think it was an excellent idea which your President conceived when he applied to the head of the Inland Revenue Department for assistance in this matter. I think he has done better in that way in calling upon the Executive of the Government for assistance rather than in lobbying the House of Commons. It is a very good thing to have such associations as yours to come into closer contact with the Executive, and ask them to carry out whatever laws exist with reference to the various industries; it is only in that way, by the intervention of such associations as yours, that we can prevent the establishment under the government of a bureaucracy, rather than of a well ordered civil service.

I must thank you for the invitation to be here personally. I came here to learn from the gentlemen now assembled. We chemists have too many subjects to study and attend to, and we cannot possibly be supposed to know much about the practical details of bee-keeping. I learned a good deal, however, and received a good many hints privately from several gentlemen now here, and although I must confess I could not follow the subject discussed yesterday, with reference to the technology of bee-keeping, and the embryology of the bee, still I learned a good deal from that discussion. I was afraid at one time yesterday that the bee-keepers of Ontario were going to belie their reputation; they ought to be men of sweetness and light from their vocation; the sweetness coming from the honey and the light from the manner in which the bee performs its duties, because we all know "how doth the little busy bee improve each shining hour." I suppose if it is allowed to anybody to be a little erratic on any occasion the bee-keeper should have that license, and should be excused if he comes to these meetings with a bee in his bonnet; that means, among us Scotchmen, that when a man is a little off he is said to have "a bee in his bonnet." However, the thing has gone off very nicely, and now after having expressed my feelings to the members of this Association, I suppose we might speak of business, and I might try to explain in what way the Government, or at any rate that branch of the Government called the Inland Revenue Department, can assist the bee-keepers. I do not think the gentlemen now present are fully aware of our abilities in that respect. If they had been aware of the extent to which it was possible for the Department to help them I do not think they would have been so very anxious about obtaining additional legislation on the subject; they would have tried, I think, in the first place, to have made use of the powers which the Government now has, before proceeding much further. I was not aware that there was additional legislation on the subject going on until after the passage of Dr. Sproule's bill, and before that time Dr. Sproule, among others, had suggested that we should obtain samples of honey throughout the country, which the present Adulteration Act allows us to do. It has been done before, but we have now started to do the matter up a little more thoroughly. Already orders have been issued for the collection of a large number of samples, I should think about 160, and they have been collected, for the most part. These samples, when they are being collected, are each divided into three parts: one remains with the seller of the sample, another is put in the hands of the local or district analyst, and the third part or duplicate is sent to Ottawa in case a duplicate analysis of it may be desired.

Now, the Act itself may have been to some extent misunderstood by not only gentlemen here present but others outside. The name "Adulteration Act" leads one to suppose that the Act is for the purpose of preventing the sale of any food or drug which may contain something injurious. It certainly does that, but it goes farther and I think I may say that the chief object of the Adulteration Act reaches into the realms of trade, tries to secure that those articles which are sold are such as the purchaser wishes when he

asks for them; and that I think is the principal object of the Adulteration Act. A man, when he buys anything, has a right to that which he thinks he is going to get—to that which he asks for. The Adulteration Act provides that food shall be deemed to be adulterated within the meaning of this Act:—

(1) If any substance has been mixed with it, so as to reduce or lower or injuriously affect its quality or strength;

(2) If any inferior or cheaper substance has been substituted, wholly or in part, for the article;

(3) If any valuable constituent of the article has been wholly or in part abstracted;

(4) If it is an imitation of or is sold under the name of another article.

So that you see from this the Adulteration Act spreads over very wide ground indeed, and if an article is sold as honey which is merely an imitation of it, the Act comes in very forcibly indeed. The Act describes the manner in which it shall be carried out, and in which its provisions shall be applied. With regard to the samples that are now being collected, the district analysts have first to examine them and make their reports. In this case, however, the samples will not only be examined by the district analysts (there are eight district analysts in the Dominion I believe), but will also be examined at headquarters in Ottawa. After the examination is finished, the Act provides for proceeding against those whose samples may have been found to be suspicious or adulterated.

We have introduced another system which the Act does not prevent our practising, and which we have found to be of great advantage. We have published something like forty bulletins, which are partly for the information of the public and partly for the purpose of showing which samples have been found to be good and which have been found to be otherwise. In the present case it is proposed that we shall publish such a bulletin, giving the name of the vendors of the honey. The samples will be fully described, the analysis will also be given as found by the district analysts throughout the country, and on a second line will also be given the results of the analysis as carried out at Ottawa; then will be given the opinion of the district analyst and the opinion of the authorities at Ottawa on those particular samples. And it has seemed to me that before this Association should take any action as regards the points that you, Mr. President, have mentioned in the order of the proceedings, it would be well that this bulletin should be studied by yourself and the gentlemen interested so that they may form just and clear ideas of the subject before making any representation to the Government—not only to the Inland Revenue Department but to the Government itself—with a view of issuing an Order in Council. The bulletin, when published, will be, in the first place, mailed to all those who have sold samples, so that they may know exactly where they are, and a sufficient number of copies will be printed to place the bulletin in the hands of each member of this Association, if they so desire. We have adopted this plan not only for the purpose of giving publicity to our results and informing the public generally, but in order that it may have some affect in stopping adulterations and stopping illicit practices, because we have found these bulletins are very much enquired and sought after, and those who have been found guilty of selling adulterated goods are not at all anxious to find their names in this publication as having sold goods that are not up to the mark; and in that way I think the publication of these bulletins has been an advantage. In some cases when prosecutions were not vigorously followed up, we have found it really had a very considerable influence with regard to other goods, at any rate in preventing adulteration. We are, of course, not confined to merely publishing the names of the parties who have not done their duty as regards the sale of unadulterated goods. The Act goes farther and a provision has been made to avoid as much as possible prosecutions, which are disagreeable things to follow up, and which have the disagreeable effect of occasioning a vast amount of expense. We have found that this expense consisted chiefly of legal fees and lawyers' expenses; that even in cases where we succeeded in procuring a conviction against the vendor of an adulterated sample, such convictions were sometimes followed by a demand for very large amounts indeed of lawyers' fees, not

upon the defendant, but upon the prosecutor, namely the Government, and very frequently these expenses have had to be paid and paid out of the grant that the Legislature makes every year for the purpose of carrying out the provisions of the Act. Now, of course, the greater the sum that we have to pay in order to carry on the prosecutions the less is the sum that we have to expend, the less money we have to carry out the ordinary provision in regard to the examination of goods. Therefore a former Minister of Inland Revenue, the Hon. Mr. Costigan, introduced a clause, which I will read to you, which has had a very good effect in saving money, in saving fees and at the same time without having the defect of causing any injustice to be felt, or causing anyone to suppose that they were being treated unjustly. This is an amendment to section 11 of the Act. It says: "Should any sample on examination be found by the analyst to be adulterated within the meaning of this Act, and it is so reported to the Minister of Inland Revenue, the said Minister may at his discretion cause the result of the analysis to be communicated to the vendor, and require him to pay at the rate specified in the second schedule to this Act the cost of procuring and analyzing the said sample." That is to say, before any prosecution is begun, and indeed after the vendor has had the opportunity of requiring an analysis by the chief analyst in order to confirm the results of the local analyst, the Minister of Inland Revenue may say, "Now your sample has been found to be bad." That is to say, the Minister is not bound to give this intimation, but he may, if he thinks fit, tell the vendor that his sample has been found bad, and that unless he pays the expense of collecting and analyzing the sample, which in the case of honey would amount to $9, he will be proceeded against at law. In carrying out this Act, especially with regard to milk, we have tried to carry it out fairly and justly, and we have never, I think, done injustice to anyone, which is proved by the fact that no complaint has ever been made. Of course, we would render ourselves liable to an action if we were proceeding unjustly, but nothing of that kind has ever occurred or even been threatened, and in the case of milk we have found that rather than stand the trouble and expense of prosecutions the vendors were willing to pay this fine. And I suspect it would be the case, too, with a good many samples of honey that have been collected—a man rather than stand suit will pay this fine. That is only as a sort of warning; it is not to be supposed that the Minister of Inland Revenue, after a man had been once punished in that way, would allow him to escape. A record is kept, and in the case of a man persisting in this course he would be proceeded against to the utmost rigor of the law. After the vendor has a chance of settling the matter in that way, he may in effect say, "I won't pay anything; I don't think I ought to; it would not be just to exact that from me." He can refuse to pay, in which case the prosecution goes on in the old way. But I think you will perceive from this that we are able to get rid of a great many troublesome cases, and we are able in that way to save a large amount of money for public service which otherwise would go into the pockets of the legal gentlemen. Now, I think you will understand why it is that I would recommend delay in the matter in regard to recommendations to the Government, until everyone interested has had an opportunity fully to think out the matter, and fully to take advantage of the information which this bulletin will certainly contain.

I don't think there is much more to be said with regard to the Adulteration Act, the last amendment to which is dated 24th April, 1890.

Subsequent to this, of course, came Dr. Sproule's Bill, which goes a little bit further than the ordinary Adulteration Act, and which I believe (perhaps my conception of the Act is not sufficiently clear) renders it illegal for anyone to feed cane sugar to bees for the purpose of producing honey. I cannot yet see how this Act is to be carried out, or how it will be handled.

Mr. PETTIT: The Bill does not prohibit the production of sugar honey, simply the sale of of it.

Mr. MACFARLANE: I perfectly appreciate what Mr. Pettit has said, but from my point of view we of the Inland Revenue Department have only to do with the samples of honey thus sold; we have nothing to do whatever with the samples that are

merely produced by a single individual for his own consumption. Perhaps the object of the originators of Dr Sproule's Act was more to hold it up as a threat against the use of cane sugar for the production of honey, but I think it might be made use of. It is pretty well known, and I think it has been pretty well established, that in the case of bees which have an opportunity of consuming as food a larger than normal amount of cane sugar, that compound is frequently shown in the product. The little animals have not the capacity of transforming or converting an unlimited quantity of cane sugar ; it seems to pass, to a very large extent, through their bodies unchanged and can be found in the product. We may be able to find out something about that in the examinations that are now going on. Even that might be a subject for experiment as to what the quality of the honey is which would be produced by an abnormal feeding of bees on cane sugar. The impression now is that a very large amount of it is not converted and still remains as cane sugar in the product. Indeed it is stated that a sample of honey collected in the neighborhood of a beet root sugar mill, contained a much larger amount of cane sugar than usual.—as much as twelve per cent. After we have gained experience in this matter, and when those who are interested are making their application to the Government to issue an Order-in-Council stating what shall be considered a pure article, this Association might be able to suggest that honey should be considered adulterated which contained more than a certain percentage of cane sugar ; in that way the supplementary Act, of which Dr. Sproule was the author, may possibly be carried out. So that when the Association sees fit to make a suggestion to the Government with a view to the issue of an Order-in-Council, they should not only take into consideration the quantity of water that honey ought to contain, which I do not think should be allowed to be more than twenty per cent., but also to recommend the amount of cane sugar that honey should have. In that way we may be able to carry out the Act of Dr. Sproule without requiring evidence as to how the honey which had been sold had been diluted. I do not think I have touched upon all the points on which information may be required at this meeting, but I am prepared to give any explanation that may be in my power, and I am extremely anxious to hear what the opinions of the members of this Association may be as regards the points that I have brought before them this afternoon. Mr. Macfarlane's remarks were greeted with applause.

Mr. DARLING : Will there be a place in this bulletin that will be published giving the specific gravity of every sample tested ?

Mr. MACFARLANE : The ascertaining of the specific gravity of honey is rather a troublesome thing on account of its viscosity, but what amounts to the same thing will be given, that is, the percentage of water ; all that you care for as regards the specific gravity is in order to ascertain how strong the honey is. That is to say, the percentage of solid matter that is contained in honey. That will certainly be given, or what amounts to the same thing, the amount of water it contains, and with that I think you will be equally as well served as with a statement regarding the specific gravity, which, perhaps, some members of the Association might not be able to make use of.

Mr. BROWN : I am more than pleased to see our friend, Mr. Macfarlane, with us. In regard to the adulteration of honey I consider myself to have been a victim to the fraud of adulterated honey, on account of it being distributed with the grocers in eastern Ontario. I do not speak only of one certain locality or county or district, but I speak of eastern Ontario. It has been distributed freely, and I procured a sample of this so-called honey and had it analyzed by the Chief Analyst about a year ago, and his report is that there was very little honey in its contents. At the last annual meeting we had a motion brought up and passed authorizing me, as I appear to have been the greatest victim in the matter, to apply to our County Crown Attorney and have him prosecute these parties for selling or offering for sale adulterated honey—that is, in the united counties of Prescott and Russell. I wrote to him, but at this time the proposed Bill that was before Parliament was not law, and his answer was he couldn't do anything until this Bill became law. In considering the matter further I came to the conclusion that it was not the duty of the Crown Attorney to move in the matter. It was, in my opinion, the duty of the Ontario Bee-keepers' Association to move in the matter and prosecute, if it was found

necessary to do so, any parties manufacturing or offering for sale adulterated honey within the Province of Ontario.

Mr. MACFARLANE: I would answer that, in my opinion, all that this Association has to do in the matter is to call the attention of the Inland Revenue Department of the Government as to the actual fault and ask them to put the provisions of the Adulteration Act in force. It is not the duty of this Association or of any single individual to collect a sample and send it to any analyst, whether the chief or local analyst, because the Act provides in what way the sample is to be taken.

Mr. HOLTERMANN: The idea is that it is the duty of the Department of Inland Revenue to carry out the law in that just as it is the duty of the Government to carry it out in other respects.

Mr MACFARLANE: It is the duty of the Department to carry out the law that has been made by the Government, and a certain sum of money is devoted to that purpose. The Association have a very useful part to perform to keep the officials who have charge of carrying out the law up to the mark.

Mr. PETTIT: I would just like to warn the Association to be very cautious about calling the attention of the Government to any case unless they are very sure, because a failure only strengthens the other side.

Mr. BROWN: How are we to be sure? Have we not to procure a sample of this adulterated honey, leave one portion with the vendor, the other with the district analyst and send the other to the chief analyst?

Mr. MACFARLANE: Yes, but that is done by the officer of the Department, not by the single individual who feels himself aggrieved. That is done after the information has been given by the aggrieved person.

Mr. HOLTERMANN: I think the idea is that we should not be reckless and send in a man's name when we have no grounds for suspicion. The idea I have of it is this, that if we have some reasonable grounds for suspicion we then write the Department of Inland revenue; the Department takes the matter in hand and if the honey is pure there is no harm done, but at the same time we do not want to put the Department to unnecessary trouble.

Mr. MACFARLANE: It is open to this Association, if they feel so minded, to appoint a committee before which all such cases shall come. Whenever anyone thinks that illicit selling is going on in any place, let it be brought before that committee and let those gentlemen, who understand the matter thoroughly from a practical point of view, consider whether it would be right in these cases to call the attention of the Department to the subject. That is a matter that is entirely in your own hands, and I have no doubt that if representations came from a committee of this Association it would certainly come with much greater force than from any single individual in any outside part of the country. In regard to milk it is the duty of the Department to cause a collection of samples whenever they think fit.

After a lengthy discussion Mr. BEST moved, seconded by Mr. McEVOY, That the Association take the procedure laid down by Mr. McFarlane of having a committee appointed to take action, to go through the matter in connection with the individual who brings the complaint forward and allow it to take its course as prescribed by the Government; to let the Government collect the samples, and if it should fail the bee-keepers will not be blamed quite so much probably as they would if they sent their samples there and paid their $5. The Government has broad shoulders, and if there is any blame attached let the Government take it, and we will certainly have the thing properly investigated.

Mr. GEMMELL: Will the President appoint a committee?

Mr. DARLING: Since we adopted by-laws yesterday that provide for the appointment of an executive committee, why not let that executive committee attend to this matter?

Mr. BEST: I take pleasure in amending my previous motion, and of moving, seconded by Mr. Gemmell, that the executive committee act in the capacity mentioned in my motion. Carried.

Mr. PETTIT: I do feel this Association owes many thanks to Mr. Macfarlane, and I rise to move a vote of thanks to him for the great help he has given us.

Mr. MCKNIGHT: I have very much pleasure in seconding that motion. It it certainly an honor to us and to every other kindred association to have such men as Mr. Macfarlane amongst us: and we recognize the good will of the Government in permitting officials like Mr. Macfarlane to come amongst us and give their opinions based upon extended experience and perfect knowledge of the particular department that they are entrusted with controlling. I think we have a right to feel very much flattered indeed in this subsidiary branch of the great agricultural interests of the country in having Mr. Macfarlane here.

Mr. MACFARLANE: Before you put that motion or any motion to the meeting I would just like to say that we, civil servants, are servants of the public; we are paid, for serving them; we may not be able to serve them in every capacity, but whatever knowledge we have about honey and other things, that we place at the service of such associations as this, provided they are willing to make use of it. It is our duty to do so, and unless you insist upon it, the passage of any particular resolution thanking us for what we do is perhaps out of place. What we do we do as our duty.

The motion was carried by a rising vote.

## REPORT OF AFFILIATED SOCIETIES

The SECRETARY read the following report:

There have been twelve societies in affiliation during the past year. Out of the twelve there have been nine reported. Owing to the days being so stormy the York association did not have meetings at their appointed and re-appointed times, and for this reason they could not report. There are also two that have not reported besides the York.

We find that the reports are not as full as desired in some ways—the reports of the production of honey and the increase of bees might be fuller; but we believe that there can be a somewhat accurate account of the increase of bees and production of honey per colony in the Province arrived at.

It is found that the moneys granted to the societies have been expended closely, as provided by the by-laws of this Association, namely, for grants to agricultural societies to be expended for honey prizes, for periodicals to their members, for expenses of their delegates to meetings of this Association, as well as for advertising their annual meetings.

The reports of increase of bees shows about an average of 65 per cent, or from 1,553 colonies in spring to 2,553.

The amount of honey produced from the reported colonies has been 9,899 pounds of comb and 80,902 of extracted, or an average of six pounds of comb and fifty-two pounds of extracted per colony. We believe this shows a very satisfactory season to the bee-keepers of the Province, and we trust may often be followed.

W. COUSE, Secretary.

Mr. NEWTON raised the question as to the high freight rates charged on honey. Messrs. Allen, Couse, Pettit, Holtermann, McKnight and McEvoy took part in the discussion, after which it was moved by Mr. NEWTON, seconded by Mr. MCEVOY, that Messrs. Gemmell and Holtermann be appointed a committee to wait upon the Classification Board, which meets in January next, to arrange if possible for a lower classification of honey, which, if obtained, would reduce the freight rates thereon. Carried.

Mr. HOLTERMANN: I take great pleasure in calling upon Mr. Kinyon, of New York State, to address the meeting.

## BEE-KEEPING IN CUBA.

Mr. KINYON: I did not expect to have anything to say when I came over here I did not know I would come till yesterday morning. I got through working with the bees, and had always heard you had good meetings, so I came over to learn. I don't know that there is anything I could say that would be of instruction to you; you seem to get along here pretty well. I have learned some things here this morning. I do not wish to take up your time with something that may not be of any use to you, and the only thing I could say to you is to tell you a few things I saw in Cuba as to the way the natives keep bees. They have a long box hive, about five or six feet long, open at both ends, and when people come around to visit the bee-keeper they want to know how much wax he has; they do not take any account of the honey. The way they get their wax is this: the bees build this hive out at both ends and the natives have a long knife (every native in the country wears one strapped to his belt); they run that knife in and cut the comb off and throw it into a barrel, they jamb it down and let the honey run away; honey is so cheap there that they do not save it, but there is a large quantity of wax produced.

Mr. GEMMELL: Do they use the brood comb in the same way?

Mr. KINYON: They do not want any honey; they want wax. Some of the natives have from 25 to 500 hives. When I was there a person could hardly live there and make anything; corn and potatoes are $3 a bushel, and everything in proportion; if you have a lumber wagon they charge $25 a year; if you hang out a sign, "honey for sale," they want you to pay for that. It seems to be a great place for honey. I was there with Mr. Osborne, and he had 5,900 pounds at that time, and during a good honey flow there seems to be no limit to it. The honey flow commences there about the first of October and keeps gradually increasing until December. By this time it is at its best—from this time until the middle of January. The most of the bees kept by Americans there are kept under long sheds; they put the hives on both sides of the sheds. The bees are very gentle there; we never wore any veils, and Mr. Osborne never wore any hat when he was around home.

Mr. MCEVOY: What is wax worth?

Mr. KINYON: It is worth about twenty-two cents a pound there. They jam the wax up in these barrels. The wax moth there will eat cake wax, and after they get started they will devour it quite rapidly. A comb left in the air in three days' time will be riddled. I never saw anything like it. They have to work with the bees all summer to keep the wax moth from destroying them. The wax moth is similar to the moth here, but more persistent. The honey is very nice; it is of a light color and fine flavor, and then there is a darker honey that has a very fine flavor. Most of the honey has been shipped to Holland; there is not as much shipped there now. It is put out in casks of 1,300 pounds. They produce no comb honey; the reason for that is because the wax moth is so persistent, and another reason is that there is no call for it. In fact, the natives use very little honey.

Mr. MCKNIGHT: Is it the fact that in the higher latitudes bee-keepers cannot produce comb honey, from the fact, as I understand, that it will sour or ferment and burst the cappings of the cells?

Mr. KINYON: That is so to some extent, according to the different seasons of the year. In the winter time he can keep the honey very well; it does not rain then and the atmosphere is drier, but in the rainy season everything is damp.

Mr. PETTIT: Do you think there is any danger of the moth eating pure wax? Is it not because there is a good deal of pollen incorporated with it?

Mr. KINYON: I don't know whether that is so or not. The hive that the natives get most of their wax from is about a foot square; the brood keeps in the centre and there is not so much pollen in the ends.

Mr. MCEVOY: Did Mr. Osborne make bee-keeping pay there?

Mr. KINYON: He did until the depression and until the Spanish trouble. Foul brood seems to be very prevalent there, and very hard to get rid of.

Mr. KINYON very good-naturedly answered many questions put to him by members of the Association as to Cuba, and also as to bee-keeping in New York State, after which it was moved by Mr. McKNIGHT, seconded by Mr. GEMMELL, that the Convention adjourn to meet again at 2 p.m. Carried.

## HONEY VINEGAR.

Mr. KNIGHT: My knowledge as to honey vinegar has been mostly gained from personal experience. The sample which I have brought to the Convention has only been made about four months, and, while it is good vinegar now, it will be forty per cent. stronger after another eight months. It has not been clarified, but it is the crude article. I believe vinegar could be made from other sources and be just as good and wholesome as honey vinegar, as for instance, cider vinegar.

The British standard for vinegar is that it contain five per cent. acid and have a specific gravity of 1.019. In order to have a vinegar which will come up to that standard the use of a pound and a quarter of raw sugar is required, and I do not think two pounds of honey contain more saccharine matter (which goes to make up the acid of the vinegar) than is contained in $1\frac{1}{4}$ pounds of raw sugar. The sample of vinegar before the Convention is taken from a quantity prepared by taking a forty-gallon barrel which had the head knocked out, with a tap at the bottom, something like the tap in a honey extractor. In the barrel was placed twenty pounds of honey to forty gallons of rainwater taken from my cistern. Nothing was added to that to hasten the process of change. Over the top I placed a piece of gauze to keep out dust and flies. Cleanliness is a necessity.

The first fermentation which results produces alcohol which the second fermentation changes into acetic acid.

I think bee-keepers ought to produce all the vinegar they require about their own premises. Honey vinegar can be made out of drippings and refuse, the result of cappings, and all that sort of thing, which cannot be sold, it only being necessary to put in sufficient to bring the mixture up to the standard of strength. Some consideration has to be given to the temperature at which it is kept; if it gets below forty-two degrees no change will take place. I placed my barrel of honey and water mixture in a cold grapery, where it got the benefit of the sun, keeping up the temperature and hastening the changes.

I do not think there is much prospect of doing a great business in honey vinegar. Grocers in a good way of business generally buy their vinegar in ten barrel lots, and will not bother with anything less; and will want the same terms on honey vinegar as when buying from ordinary manufacturers.

Replying to a question by a member, the speaker said:

Vinegar can be clarified by the use of izinglass, whites of eggs (which are pure albumen,) or skimmed milk. Not only vinegar and cider but also wines are clarified by the use of such articles. The result is obtained through the substance used coagulating and falling to the bottom, taking with it the floating impurities.

## ELECTION OF OFFICERS.

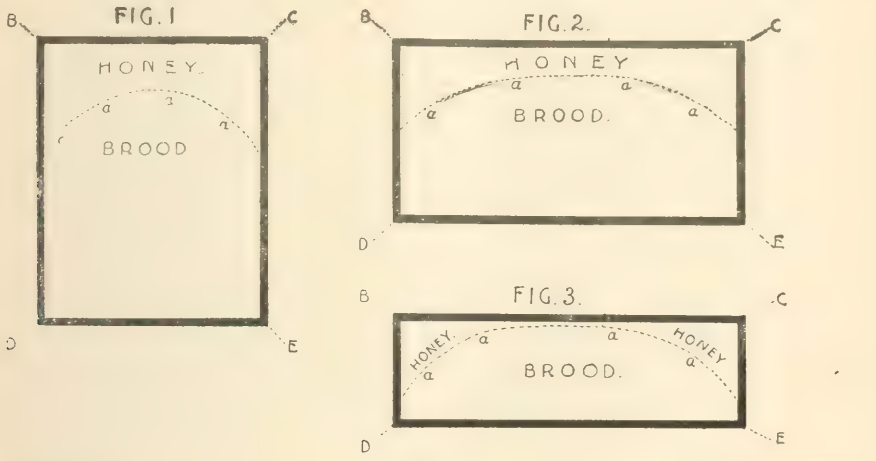
President HOLTERMANN then called for the nomination of officers, stating that he was not in the field, and asking Messrs. Hoshal and Craig to act as scrutineers. The list will be found on page 4.

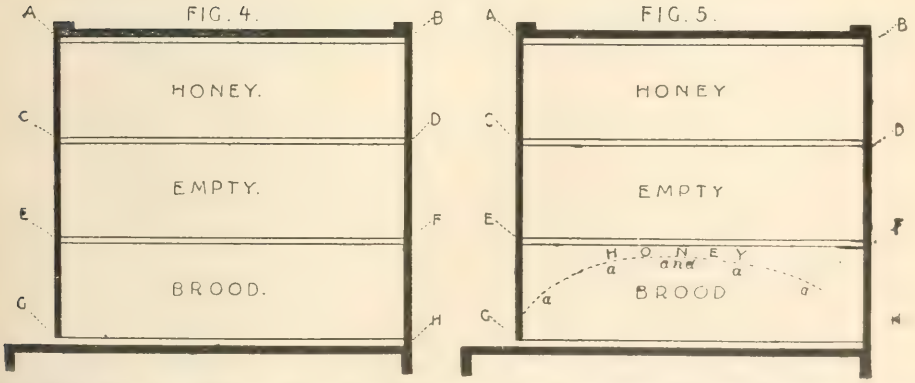
## THE PRINCIPLES OF SUMMER MANAGEMENT.

By A. E. Hoshal, Beamsville.

Every art and every science has certain underlying fundamental principles which govern it, and which, under the same circumstances, produce unvaryingly the same results. Honey producing is no exception to this rule. If we will but observe various colonies of bees and their methods of working, it will be found that they do so along certain definite lines, or in other words, in a certain well defined manner in accordance with their instinct, no matter whether they are domiciled in the most approved modern hive, among the rocks, or even in the carcass of a dead lion. Now, I wish you to observe very carefully, and to thoroughly understand what this general yet well defined manner in which they work under these varying circumstances is.

A colony of bees, when left to itself, will store some of its honey about the sides of its brood-nest, but the great bulk of it will be above; in fact this latter instinct so predominates that it is generally said among bee-keepers that "bees always store their honey




above their brood. Besides, they store it as near the top of their hive as possible, and for consumption use that lowest down and nearest the brood. In breeding, the upper part of the brood-nest is kept immediately next to the honey. When the brood in the upper part of the brood-nest hatches, and the honey flow is sufficient, the bees will fill with honey the cells out of which it hatched, and thus they continue to work as it were to keep con-

nected the brood and honey by filling with honey this shallow space of empty cells continually being created between them through the hatching of brood, thereby forcing the brood downward, keeping the honey at the top, and if there be not sufficient comb to continue this, compelling them to build more beneath the brood for its accommodation until the hive is filled. To illustrate, let figs. 1, 2 and 3 represent hives of various sizes and shapes cut perpendicularly in two through the centre so as to expose the central comb of each. Then *a a a a*, will represent in each case about the dividing line between the brood and the honey. That portion of the hive above this line will be filled with honey, while the brood will be immediately next to and below it. Should there be any unoccupied comb or space in the hive (unless it be unreasonably long or wide in proportion to the strength of the colony) it will be found between the brood and the bottom of the hive, D, E. It will be found also that it is in the emptied cells, made so by the hatching of the brood, along and nearest the line *a a a a* that the colony continually stores its honey. Now, from these simple observations of the way in which bees instinctively work and thoroughly understood in all its bearings do we learn the fundamental principles of bee-keeping as they relate to summer management and the adaptation of our hives to the requirements of our colonies in order that they may work their best for us.

Other things being equal we observe

(1) That surplus cases should be added above the broodnest, and hence our hives built for top storage.

(2) That we should not have our bees travelling over honey at the top or sides of the broodnest to store surplus, thus compelling them to do so at a distance from their brood; hence the dividing line between the brood chamber and surplus apartments of our hives should come right where the brood and honey meet. In figs. 1, 2 and 3 this should be at *a a a a*. In other words, our management should be such that there will be no honey, or as little as possible, at the top of our brood chamber whenever we wish our bees to store in the surplus cases above it.

(3) That brood should extend underneath the whole surface of the surplus cases; hence these cases should not extend endwise or sidewise beyond the brood chamber; neither should there be combs of honey beneath them at the sides of the brood chamber. It is a fact that the greater the number of combs a brood chamber is in width, the greater the liability of having its outside combs filled with honey, hence a brood chamber should tend toward the narrow as much as practical rather than toward the wide.

(4) From principles two and three, we see that any system of management which attempts to fill the brood chamber with honey for winter stores, either before or while the honey harvest is on, does so at the expense of important conditions necessary in developing from our colonies the most work, and accordingly lessens the amount of honey gathered and stored.

(5) That when one or more surplus cases have been filled sufficiently to require the addition of another, they should be placed right between the brood and the honey already stored, and as might be inferred, and which experiment proves true, the shallower the opening which we make for storage between the brood and honey, the stronger the instinct of the bees to connect the brood and honey by filling this space thus created between them. To illustrate this, let fig. 4 represent a hive of which E F H G is the brood-chamber filled with brood to its very top, E F. A B D C represents a surplus case that has been filled sufficiently by the colony to require the addition of an empty one, C D F E, which, if everything is rightly arranged, can be placed exactly between the brood E F H G and the honey A B D C, and the shallower the opening made by the addition of this empty case, C D F E, between the brood and the honey, the stronger the instinct of the bees to fill it. Fig. 5 illustrates a serious mistake that is made in various ways by many bee-keepers. A B H G again represents a hive, E F H G being its brood-chamber, which is filled with brood and honey, *a a a a* being the dividing line between them. A B D C again, as in fig. 4, represents a surplus case which has been sufficiently filled by the colony to require the addition of an empty one, C D F E, which has been added as illustrated, namely, in the midst of the honey, and *not* between the brood and

the honey, as in fig. 4. It will be observed now, that, in order to store honey in the empty case C D F E, the bees will have to cross the honey in the brood-chamber between *a a a a* and E F, which is compelling them to store their honey at a distance from their brood, instead of immediately next to it, as in fig. 4. Now, from our observations as to the distinct definite manner in which bees instinctively work under varying circumstances, and, as already illustrated by figs. 1, 2 and 3, we at once see that this is a mistake. The farther we place our surplus cases from the brood, when we wish the bees to fill them, the less inclined, it will be found, are they to fill them. No bee keeper of experience, when adding surplus cases, ever places them above filled ones: experience has taught him, or soon will, that the bees will neglect them. He may not know that it is because they are removed from the brood, and that when he places them above a brood-chamber which is filled with honey about the top, he is crossing the honey-storing instinct of his bees, in exactly the same way that he does when, in adding an empty surplus case, he places it above a filled one. In either case he is compelling his bees to store their honey at a distance from their brood, only in the one case the distance is less than in the other, and just in proportion as this distance is increased, do we lessen the honey-storing instinct of our bees, and consequently the amount of honey stored.

(6) A little reflection shows, and experience proves it true, that the deeper the brood-chamber the greater the liability to have honey stored at the top of it by the bees, (observe figs. 1, 2 and 3 in this connection), which, in adding surplus cases, prevents them being placed near or immediately next the brood, as in fig. 4, but removes them from it, as in fig. 5, thereby lessening the honey-storing instinct of our bees.

(7) A little mathematical calculation shows, too, that the deeper the brood chamber the less surface there can be above it for top storage, and hence the deeper will the surplus cases have to be in order to have sufficient capacity, in adding which the deeper will be the opening that is made between the brood and the honey, thereby again lessening the instinct of our bees to fill promptly this space.

(8) It is a fact that, when a brood-chamber is larger than a queen can keep filled with brood, the remaining space will be filled with honey. We see, therefore, that such is a mistake where we wish a brood chamber filled with brood and devoid of honey.

Now I do not wish it understood that we cannot at times change, to our advantage, the natural conditions under which our colonies work, only that we cannot do it without loss, like in the instance just quoted, when it diverts the instincts of our bees from the end we have in view. The queen excluding honey board between the brood and surplus apartments, where used, is an unnatural condition, yet it increases both the quantity and quality of our honey: (1) Through preventing the further expansion of the brood nest, when more brood means more bees, at a season of the year when they will be consumers instead of gatherers, it diverts, so to speak, the energy of our colonies from unnecessary brooding to honey-gathering, and thereby also prevents unnecessary consumption of stores. (2) It enables us to keep our brood-chamber in a condition more perfectly in accordance with the principles above enumerated, than without it; and (3) By keeping the brood out of the surplus apartment, gives us a better quality of honey, besides all the advantages to be gained in manipulating our hives.

For various reasons we may not always be able to so arrange the conditions of our colonies during the honey flow as to develop their working energy to the fullest extent, but just in proportion as we fail in doing so, do we fail in securing the greatest amount of honey from our colonies; and not only this, but also succeed, to our own disadvantage, in developing among them the swarming impulse. You will have noticed, as I have already shown, how bees when left to themselves always store their honey above their brood, but build their comb beneath it. In the production of comb honey we partially reverse this order by compelling them to build their comb above it, and this, I claim, is the cause, to a very large extent, for the marked difference there is in results in colonies worked for comb honey as compared with those worked for extracted, and not, that the one has so very much more work to do than the other in the building of comb; it is also the reason why colonies worked for comb honey are so much more liable to

swarm than those worked for extracted honey. The first result is but another illustration of failing to develop the working energy of our colonies to the fullest extent through compelling them to work in a manner contrary to their instinct; while the second result is the sequence of it, and a simple, practical illustration of how we can develop the swarming impulse of our colonies through failing to develop their working energies. If we wish to retard swarming, if not prevent it altogether, we must work our colonies to their utmost for honey, along those lines which tend to develop among them their strongest, active, honey-gathering energy.

Another factor that cannot be overlooked in summer management is the strength of our colonies and their honey-gathering and other qualities. No system of management, however correct in principle and skilfully executed, can atone for a neglect of either of these factors. If we are to have strong colonies, we must see, among other things, that each is supplied the season previous with queens of sufficient vitality and prolificness to keep the brood chamber of their respective hives full of brood throughout the entire season; and not only this, but their progeny must inherit from them the strongest honey gathering instinct and other qualities that may be desirable. It is a well known fact among experienced bee-keepers that there is as much difference in the honey gathering and other qualities of bees as there is in the milking qualities of cows, and it is the height of folly to tolerate anything in our apiaries but the best.

In honey production, as in all other lines of production, we strive to obtain the greatest amount with the least expense of time and labor. In conclusion, I would ask you to note that with respect to securing our honey with the least expense of time and labor I have said nothing. I have only mentioned a few of those principles which bear upon how to secure the greatest amount of honey, and which, I trust, will help us to a right understanding of the lines along which we should work, and give us a centre from which to direct our thought, and a basis upon which to build a correct common sense and scientific management of our apiaries. The principles which I have set forth I consider fundamental, and that they form the great central sun around which the successful management of our apiaries revolve.

Mr. Pettitt, while not agreeing with the paper in all points, congratulated Mr. Hoshal upon the presentation of the subject. He said I think, it very needful to have bees coming on after the honey-flow is over, for the purpose of strengthening the hive for wintering over. I took 2,400 pounds of comb honey last year, and did not use honey-boards or queen excluders in a quarter of the hives, and yet the queen only went into five of the sections. The frame which I used is nine inches from bottom to top. I find if the sections are filled with foundation, and the queen and the bees start to work nicely below, the queen will stay there and the bees will work above; but when putting them on starters and putting supers on immediately there is danger of the queen going up if a honey-board is not used. When putting a new swarm into a hive, if I wish comb honey, I make it a rule to put supers on at once and put in a queen-excluder, to keep the queen down for a few days; but I find that a queen-excluder more or less annoys the bees and hinders the work. After the queen gets nicely to work I slip the queen-excluder out.

Mr. Hoshal: There should be a lot of young bees to stay in the hive, while all old enough, during the honey-flow, ought to go to the field. I only desire to stop surplus brood-raising over what would be required to keep up the colony for the winter. In my own practice, I use a hive five and one-half inches deep. If by the middle of June a queen has only about five frames filled with brood, it is better to put in a dummy and stop the brooding than to develop further, which could only result in bringing young bees into the field after the honey-flow, when they would be of no use for gathering honey.

Mr. Davidson: I never use a honey-board or queen-excluder when wanting section honey, but if extracting from the top I do use one.

Mr. McKnight: I never use queen-excluders and never saw any necessity for their use in taking comb honey under the conditions that I have taken it for twelve or

fourteen years; I get my comb honey from my first swarms; and in twelve years' experience I never lost a single section through brood or pollen being stored over the brood chamber. I never interfere with the brooding of my bees. I think they know more about the business than I do; I just let them go on as long or as much as they please, and the more bees that go into winter quarters with me in a hive, I expect the more bees will come out in the spring, and I will have so much more working force. They will consume more stores; that is something that follows as a matter of fact; it cannot be avoided. But I want the bees in my hives going into winter quarters to be young. All the authorities which we have any right to rely upon state that the natural life of a bee during the working season is from six to eight weeks; the strength is kept up by the fecundity of the queen; that is, reproducing her kind during that time in great quantity, but when the fall comes on and we want a working force for the next year, we can only get it by the producing force that is left in the hive. While the natural life of the bee may be six or seven weeks in the working season we all know it is more than that under some conditions; we all know bees will live seven or eight months in the winter time. They are in a state of hybernation; the bees are living and not living, and it does not require very much sustenance to contain the little spark of life that exists; they do not consume one-fifth part of the sustenance that is necessary to sustain them in active exercise. I am very much pleased with the paper; it provides a good deal of food for discussion, and that is one of the very best merits that a paper can possess. I use a hive with a frame in the brood chamber, fifteen inches across and nine inches deep, inside measurement, and the top story or super is a counterpart of the brood chamber. I use a honey-board. I think what the gentleman calls a honey-board ought to be designated as a queen-excluder. I never use them and I don't want to use them, and I don't believe I ever will; I am satisfied with my method and the results I have secured from it. I do not believe the old bees that winter do anything for us at all the succeeding season in collecting honey; I believe they are all dead before the honey flow comes; but they have performed their functions in preparing a new race of bees to take their places and go out and work for their queen. If the honey bee was like the humble bee I would not want any more than a single queen in my hive during the winter. The honey bee does not feed her young; some other tenants of the hive have to do that. The bees that survive the winter I believe do that work, and there is a succeeding generation to take the work that was their duty in the past season. Therefore I say it is important that we should bring out our hive with a good strong force of bees in the spring.

Mr. Newton: Mr. Hoshal in his paper related that after the 20th July his bees were no good to him and gathered nothing. Therefore if they gathered nothing, and there was no fall flow, then there were no young bees hatched after that, and therefore I don't know where the bees are coming from for the next spring. I let my bees take their own chances and let them brood; if they want food I give it to them and that is the way, I think, to have full hives of bees. I use the shallow frame 8 1/4 by 17 1/4. It is very seldom that I ever use a queen-excluder; I think it is against comb honey methods, because I don't think the bees will enter the sections so readily if that is between them. I have been seven years in the business for myself, and before that I was with some of the larger bee-keepers in this line, and I know something about the production of comb honey. This year has been the only year that I ever had a queen enter the comb honey sections, and that was caused by my experimenting, using heavy foundations in the sections. When hiving my swarms I hive them on five starters, the outside filled with dummies.

Mr. McEvoy: The system as Mr. Hoshal has given it is the most perfect I ever heard of in my life. It is the most practical thing ever given in this country, taking it all in all.

Mr. McKnight: What is a dummy? How is it used? How is it placed in the hive, and what effect has it?

Mr. McEvoy: Mr. McKnight knows what that means, as well as I do. It means a division; more, it means something to contract the brood nest, only it is called a dummy. It narrows the space.

Mr. Hoshal: Speaking of contracting the brood chamber, I perfectly agree with that, and I would do the same thing if I was using that hive of Mr. McKnight's; it is the only thing you could do. If he, in using that contraction instead of having those frames set up the deep way, could somehow or other flop them over at the side so that he could spread his brood out under the whole surface; make it shallower; keep the same cubic space, but, instead of getting it through depth, get it in width and make it shallower and thus bring the brood under the whole surface of the surplus case, and also bring the whole body of your working force of bees nearer to the working section, you would get more comb honey. I don't mean to say you don't get any, but I do mean you would get better results.

Mr McKnight: I want to repeat my question: What is a dummy? After fifteen years' experience I don't know what it is. Does a dummy mean some board or something else that is placed in the hive to contract or gather together, or keep within certain limits, the bees, and does it extend to the bottom of the hive?

Mr. Gemmell: Yes.

Mr. McKnight: Do dummies, as they are generally known, extend to the bottom of the hive and rest flatly upon it?

Mr. Gemmell: No.

Mr. Sparling: I use dummies. A dummy, as it is generally known, is merely a plain board that hangs on the bearings to take the place of a frame; it does not go to the bottom. When my hive swarms I have five frames with starters and I put three dummies in place of three frames and I put on a queen-excluder which keeps the queen from going up into the sections. There is more or less risk in hiving on five frames of the queen going up above; and I don't find any difficulty about the queen filling the upper part of the frame with honey; she will fill, if she is a fairly good queen, the five frames full of brood.

Mr. McKnight: What advantage do you derive from putting in those three frames instead of putting in three combs?

Mr. Sparling: If you put in three combs the queen would lay in them at once. The other five have merely starters in them.

Mr. McKnight: Dummies are a perfect nuisance.

Mr. Sparling: No, sir, because you force your bees at once into the sections. They have not very much room below and they are bound to go up above. I put the sections on at once when I hive a swarm. The bees commence at once to work in the sections. I do not wait ten days, like Mr. McKnight, and lose the best of the honey flow. I put them on at once and the bees are at work an hour afterwards. In fact, I take sections of the old hive and the bees from the old hive and the sections are never empty. I do so to get the most honey. Unlike Mr. Hoshal I don't think five frames are enough; I get a fall flow of honey. When my honey begins to slacken in flow I fill up the hive with three frames filled with foundation, or better still, if I have it, with combs, and the queen will extend the brood nest a little and I have a stronger force to go into winter quarters Of course it would not work with Mr. Hoshal, because his honey shuts off too early, but with me I always get a good fall flow and it works well.

Mr. Hoshal: Perfectly right, too.

Mr. Sparling called for a showing of hands to ascertain how many bee-keepers present hived on frames with starters for comb honey. In response to his request fourteen raised their hands.

President Darling: I take this opportunity of thanking you for the honor you have placed upon me. I feel the great responsibility that rests on my shoulders, and I think you will all agree with me when I say that no matter what the ability of the man

is that you place in this position, unless you second his efforts they will not amount to very much. And no matter if you place a man here who has not the best abilities, if you do your best he will not be a complete failure. I hope that you, as an Association, will all stand by me and help me to do the best I can in forwarding the interests of this Association, and the interests of the bee-keepers throughout this Province, by giving me the best possible assistance you can during my stay in power. (Applause.) I was just going to say that perhaps it would only be fair, since the question is put in that way, to ask all those who produce comb honey and do not do so on starters to hold up their hands, but I rather think that, as a rule, nearly all of those who produce comb honey hive on starters.

Mr. PETTIT: Starters and dummies.

Mr. HOSHAL: In explanation, as there seems to be some misunderstanding, I would say that in the first instance I use a Hedden hive pure and simple; that hive is filled; the brood chamber of it has capacity for Langstroth frames as large as any you are using; you can make it either five, ten, fifteen, twenty, twenty-five or thirty, any multiple of five We start that in the spring and sometimes in the winter; it depends on the strength of the colony. We keep extending that brood chamber in the summer season as long as the forcing of the brood is going to place bees in the field to gather honey, but as soon as that time of the season is past we stop extending. But, we do not make it smaller after that point; we simply stop expanding, but it is still a monstrous big hive. Instead of using what is termed a dummy or something to board up that space, I simply contract by removing one of those sections of the brood chamber.

Mr. SPARLING: Do you get pollen in the sections?

Mr. HOSHAL: No, I do not. You can put pollen in the sections if you want it. If you use sections above that contain traces of comb which can be drawn out by the bees, or foundation that is thick, you will get pollen there, or if you put sections up there that have had comb in the previous season; but if you build the sections complete from the start of thin foundation you will be all right. What I have done is to use two honey boards, and from experience I am convinced that they do not interfere with the working of the bees. At first I was very obstinate about it, but after experimenting with hive after hive I was forced to the conclusion against my own judgment that they did not interfere with the working of the bees above.

Mr. MCKNIGHT: I can understand now why Mr. Hoshal's paper created so much interest. I am aware now that he uses a hive that is not generally used, the Hedden hive. The Hedden hive proper is only about five inches high; you can put another on it and then it becomes something like the ordinary hive that is used. But Mr. Hoshal tells us that he has wintered his bees in that Hedden hive both with two sections and with a single section and brood chamber only five inches deep. There are very few I think who know how bees winter under conditions of that kind.

Mr. GEMMELL: I know.

Mr. MCKNIGHT: You are an exception if you do. I am glad to know Mr. Hoshal has brought up this question. If they can be wintered well in such a contracted space as that, all the better.

Mr. HOLMES: I move that a vote of thanks be extended to Mr. Hoshal. I have listened with a very great deal of interest to the paper and to the discussion throughout, and there is room for congratulation in the fact that he has set forth the general principles of success without condemning every other mode.

Mr. BEST: In seconding that motion, I agree with the remarks of Mr. McKnight that it was a good paper; it has certainly brought about discussion that has been appreciated by the majority of those here more than anything we have had lately, and it has certainly done a great deal of good to this Association; therefore I take great pleasure in seconding the motion.

President DARLING put the motion, which was carried with applause.

Mr. HOSHAL: I thank you very much for you kindness and for your appreciation.

## TREASURER'S REPORT.

Mr. Martin Emigh read the Treasurer's report, which on motion was adopted.

(For Treasurer's Report see page 6.)

## INCREASING COLONIES.

The President read the following question: "What is the best way to increase the number of colonies one-half in outyards and also prevent much swarming?"

Mr. Kinyon: I believe mostly all of you have read the way Mr. Elwood took to prevent swarming. He has about 100 to 110 colonies in each yard, and, when the swarming season comes on, and the bees are liable to swarm, he selects ten or twelve queens in each yard and puts them in an empty hive, kills the queens in the next nine or ten hives, and then takes a frame of the brood from the hive where the queen is killed and puts that in the hive where the queen was put. That makes about ten per cent. increase in each yard; that leaves the colonies queenless when their main honey flow is coming on. When the danger of swarming is over this plan will reduce the amount of young brood in the hive and take out the swarming impulse. In about ten days or two weeks he takes a frame of old brood and exchanges it for a frame of young brood and gives them a chance to raise a queen again and that does away with swarming in each yard.

Mr. Darling: The plan spoken of by Mr. Kinyon suggested itself to me when I was listening to Mr. Hoshal's paper. There is one point Mr. Kinyon did not touch upon. I think all bee-keepers will admit that when colonies are made queenless and the brood rearing ceases for a time, as he says, they get more honey because of there being less brood to feed.

Mr. Kinyon: I may say you have to look through the colonies as often as once in nine days, so that there will be no danger of the queens hatching and going away in the meantime. Also, there is not so much young brood to take care of, and more of those young bees will go into the field and more honey will go into the boxes, so that it will accomplish two purposes.

Mr. Pettit: About how long do you have your hives queenless?

Mr. Kinyon: According to circumstances, from ten days to two weeks. By being queenless the swarming impulse is discouraged, because the young brood is growing older.

Mr. Pettit: Don't you find that that fills your cells with a good deal of pollen?

Mr. Kinyon: There does not seem to be any more pollen than the young bees will consume.

Mr. Hoshal: Did you notice any difference in the working energies of the colonies?

Mr. Kinyon: I found no difference.

Mr. Armstrong: I find as soon as the queen is taken away from the colony, the colony does not work as well as while the queen is there.

Mr. McEvoy: Does Mr. Elwood follow the practice of doing away with the queens wholesale?

Mr. Kinyon: Yes.

The President: The next question is: "There is a decrease of membership from former years, and a decrease of $100 or $150 grant. Could not something be done to improve matters? I should think we should have ten times as many members. How would it do to give members two bee journals, a queen, a book, a smoker or something else with one bee journal; or, no bee journal and more supplies, giving members their choice, and hold the annual meeting consecutively in each affiliated county, and at fair time, if near a city in the city, and the Secretary, President and one other official, say the Vice-President or Vice-Inspector or Treasurer be paid their expenses."

Mr. McKnight: It might be presumed by some persons that I was the party that asked that question. I am not. I am quite in accord with some of the questioner's views, and some of his views show that he is not quite conversant with the history of this Association. Its members before now have got a book, they have got a smoker, they have got queens, and they have got the journal for more than one or two or three years. The only suggestion, as far as getting is concerned, is that they get two journals. Why not say three? I don't think, however, that this is just the time to discuss that question, as it will come up bye and bye. In fact, I presume that is for the Board of Directors to deal with exclusively, as to what means will be employed to keep up and interest the membership.

## SECOND DAY.—EVENING SESSION.

President Darling called the meeting to order at eight o'clock p.m., and opened the proceedings by reading a letter from Mr. J. B. Hall, of Woodstock, asking that a resolution be passed thanking the Ottawa and Ontario Governments for the interest shown by them in the apiarists of Canada, and urging the Association to press for a still more stringent law against spurious and adulterated honey—for the same kind of law as had been granted to the cheese and butter men.

Mr. Pettit: Perhaps I can answer that letter. Although we did not get what we asked for, we have a Bill which lies in that direction, and I will just give you the views of Dr. Sproule. He says you will not get any more than you ask for. But he says my advice to you now is, do not ask just yet for anything more. Let the Bill alone, test it in the meantime, and then come and get the amendment that you need; get just what you want. Mr. Sproule says there are few Bills passed but what need amendment, and when a government has undertaken to pass a Bill if they find that Bill is wanting they feel bound to make it what it should be, and as a rule they do it. I think Mr. Hall is making a mistake, and I think we, too, would be making a mistake to follow the suggestions he makes.

Mr. McEvoy moved, seconded by Mr. Pettit, that a vote of thanks be passed to Dr. Sproule and all other members of Parliament and members of the Senate who have done what they have to put this Bill through and give this Association a Bill which, while it does not perhaps come up to all we asked for, is a long way ahead of anything we have had in the past. Carried.

## THE NATIONAL BEE-KEEPERS' UNION.

"What stand should Canadian bee-keepers take in regard to the National Bee-keepers' Union and the North American Bee-keepers' Association?"

Mr. Pettit: I would move that we do not think it advisable to have anything at all to do with it, and I want to emphasize that the object in making the motion is not at all because I have not the most friendly feeling in every way towards our brother bee-keepers across the line. I appreciate their good will and kindness in every way, but they see it as I see it, that each nation can run better by itself. That is the reason of the motion; it is not because they despise us or would not like to work with us.

Mr. Pettit then moved, seconded by Mr. Walton, that this Association take no action in regard to the National Bee-keepers Union and the North American Bee-keepers' Association. Carried.

## RENDERING OLD COMB.

A discussion took place upon the best method of rendering old comb.

Mr. NEWTON: I have used the solar extractor and get on very well, but I have some comb that I want to melt up this winter and I want to hear something with regard to the best methods of working.

Mr. PETTIT: In using the wax extractor do you put the combs more than one thick; will it do to put one on top of the other? I never tried it.

Mr. NEWTON: I generally break mine up, and after they get so that I can see the wax run out of them I stir them up with a stick. I can't very well answer how many combs I can put in at once. Sometimes I break up probably three or four at a time.

Mr. PETTIT: Did you ever try to see whether you could get the wax all out? In breaking the combs all up it seems to me the cocoons would sap up the wax. Did you ever try the two ways to see whether you would not get more wax by not breaking them.

Mr. NEWTON: That is why I break them, up because I get more wax.

Mr. HOSHAL: Have you ever tried the wax you have got to see whether it will burn? Have you put it under a microscope?

Mr. NEWTON: Yes. It will burn; I can't say it will burn very savagely. I have seen many other ways of doing it, but I don't think you will get it out as clean as you will by the solar.

Mr. HEISE: I have tried putting two old combs on top of each other in the solar extractor. With old combs that brood has been reared in, very often it won't work; with new combs it will.

Mr. CHRYSLER: I have tried getting wax out of the old combs with the solar extractor, and I did not find it satisfactory. As for very old combs, it is very unsatisfactory. If we could break up the old combs and soak them in water, and then use them in the sun extractor, I think we would do a great deal better, but the steam arising from the heat caused by the sun inside of the extractor appears to so sweat the glass on the sun extractor that it will not melt them satisfactorily, and if we have a current under the glass to carry that off we do not get the heat. I have thoroughly tried putting the old combs in a sack and putting them into a large boiler and boiling them for hours, and then squeezing that sack with strips of wood perhaps three-eighths of an inch by one, and also another set of strips across, putting on a heavy weight and press it all together. I have even failed in that way to get it out satisfactorily. It is not nearly as satisfactory as the steam wax extractor; I always find particles of wax mixed up in the refuse. What I do get from the old comb so melted up is generally very dark and very unsatisfactory; that got from the steam wax extractor is very much superior.

Mr. MCEVOY: The best extractor that I have seen anywhere is that of Mr. Hughes, of Barrie. He can explain it.

Mr. HUGHES: It would be a pretty hard thing for me to explain it. I can coil two layers of comb right in on their edge. It is done by steam; we use a coal oil stove; I can run it with one burner or three, whichever I like. The water is underneath and we put the combs in a basket with perforations; we turn on the steam and it melts the wax right out. I wire all my frames, and I can shake the frames right out and leave the refuse in it. There is a small trough runs right around the side; it starts at the back and slants to the end and down to the side and down to the centre; it is something on the same principle as the old Jones extractor, only a great deal larger, and I do it with coal oil instead of other fuel. I use the same extractor for melting honey; I can melt 200 pounds at once. I have a tube up the centre with perforated metal and the steam passes through the comb and melts everything up and there will not be any wax in it

when it comes out of it. I have tried to see if there was any wax in the refuse and I could not find any. I never burned the refuse that came from my extractor; I threw it out. I never examined it with a microscope.

Mr. ARMSTRONG: The refuse will burn fiercely if there is no wax in it at all, because I have tried it. I put my refuse into a sack and into a box with holes bored along the front, having the box on the slant, and I put all the power on to a screw that I have in connection with it, that I can put on, and the refuse that comes from it will burn.

Mr. LAING: I have an extractor that I have shown here at the Industrial Exhibition; I use it for various things; I call it the combination wax extractor. I think I could render more combs with it than any wax extractor I ever saw. It is made a boiler shape; it takes up three lids on the common stove, and from the time I start, when I get the water boiling and the steam going, I can put in fifty square feet of comb, cover it up, and when that is pretty well run out I put in about fifty more; then if I think there is quite a bit of sediment and dirt in the boiler, I let it run perhaps for a couple of hours. The centre of it is raised and there is a tube about three inches in diameter all the way up and through the centre, and a cap on the top. I can let the steam out at the top, or I can shut it down and make it come up around the boiler in the inside. I have steam in the centre and all around. In three hours from the time I start to put the old comb in it is done, and I take it off and set it to one side and start over again. The wax I run out in the first place I run over again by itself, and my work is done.

Mr. HOSHAL: I was only asking the question for personal information. It is one of those questions that I have been stuck over considerably, and I confess to a failure to my own satisfaction along that line. I have had no experience with the solar extractor. I use steam. The best way I find in using a steam wax extractor is not to put it on the stove at all, but to take a great big boiler to cover the top of your stove, if you have got enough comb, and put a little water into it, put your comb into it and melt it; then put your steam extractor on where you can keep it hot, dip it out of the boiler into the extractor, and you save an immense amount of time by doing it in this way.

At the present time I use a long wooden barrel and put the end of a steam hose into it, and then connect the steam hose with the steam extractor. The point I was trying to get at was how to get it out of the combs clean. I have picked up refuse that I have thought pretty dry and clear of wax, and which to the naked eye you would not think there was any wax in, at least a very small percentage, and on putting it under the microscope it had the appearance of but a very small percentage of dirt; it seems to be two-thirds wax, anyway.

Mr. MCEVOY: When you turn the steam into the tank to melt what you have got there, do you put the old combs in the tank?

Mr. HOSHALL: I just use a barrel and put the old combs right in.

Mr. LAING: I might say in my process I put the refuse on the fire and it would not burn, so that there was not much wax in it.

## EXPERIMENTS WITH GERMS OF FOUL BROOD.

Mr. F. C. HARRISON, B.S.A., Bacteriologist of the Agricultural College, described his experiments with foul brood. Particulars of these experiments are given in the Report of the Experimental Union.

Mr. HOLTERMANN: As far as my part is concerned, I have been amply rewarded by the result of the work, and I would like to say here, touching upon one or two of the remarks of Mr. Harrison, that the object of taking the buckwheat and clover honey was this, that I knew from painful experience that when the bees were working on buckwheat the stings were more painful than when working on clover. When the question was brought forward as to what influence formic acid might have upon the spores of the

disease, and the development of it, we acted in this way: We took the clover honey and the buckwheat honey directly from the hive, uncapped it, sealed it and sent it to Mr. Harrison. I thought there would be more formic acid generated when the bees were working on buckwheat than on clover, and the investigation of Mr. Harrison shows that is the case. With regard to the way in which that foundation was made, I may say that Mr. McEvoy saw the wax and he said he never saw finer wax, or wax which the bees would be more likely to work out quickly; that was worked in small particles; the object was to have as little heat as possible applied to the wax. It was broken in small particles and dipped and immediately milled and the swarm put upon that foundation. Mr. McEvoy inspected it and so far it is perfectly free from the disease.

## BUILDING UP OF BEES IN SPRING.

By C. W. Post, Trenton.

In writing on the above topic there is but very little that can be written or said on the subject that has not already been discussed, and in contributing this article I fear that I shall fail to add enough that has not already been written on the subject to make it of much importance to this Association.

To begin with, I believe in placing bees on their summer stands early in the spring, say the first warm days in April, and this should be done on a still day to prevent the bees from mixing. After they have had a good flight and got settled down go through the apiary and clean off the bottom boards and close the entrances from two inches in width to one-half inch, according to the strength of the colony. Now, top packing is excellent provided you have enamel cloth between the bees and the packing, otherwise I would rather take my chances with a plain wooden cover hermetically sealed.

I believe that the majority of you will agree with me that a hive painted a dark color has advantages in early spring over a white hive or an unpainted one. Now to get the advantage of a dark hive in early spring and the disadvantage of the same hive in hot weather. I have one hundred hives painted red on one side and white on the other, including both ends. In early spring they are placed on their summer stands with the red side to the south, and at the advent of hot weather they are taken to the out apiaries and placed with the white side to the south, thus giving me the advantages of a hot hive in cool weather and a cool hive in hot weather. From the above you will learn that I am in favor of a dark colored hive in early spring, as the daily warming up by the sun stimulates the bees to greater activity.

The first fine day I go through the apiary and see how they are fixed for stores You will always find some short of stores while others have plenty to spare. I equalize them as nearly as possible, and all colonies not covering five frames have a division board placed in the hive and the bees are domiciled in the red side of the hive. I then give them a severe letting alone for about three weeks.

This will bring it up to the first week in May, when they should be gone through again, and if any of the light ones should need more room (although it is not likely to be the case) give them a frame of honey next to the red side of the hive. Do not for your life place it between the brood. The stronger colonies are not likely to need any attention at this time if they have plenty of honey. They are then left till fruit bloom. At this time the young bees are hatching very fast and stimulative feeding is a great advantage to them, but if done before (with myself) the very opposite results follow. At this time some colonies will be filled with brood and nearly all that are on division boards are crowded for room. At this time, or between this time and the opening of clover, I draw a frame of hatching brood from the best colonies and build up the best ones on division boards and at the opening of the honey season I unite the weak ones, if any.

To recapitulate, I believe in placing bees on their summer stands early in the spring and crowding them up in as small space as they can occupy, in a hive painted a dark color in early spring and white after settled hot weather. I believe in top packing in early spring, provided there is no escape of heat or moisture from the brood nest. I favor stimulative feeding if done after young bees are hatching in large numbers; and for producing extracted honey I believe it pays to equalize your colonies in strength as nearly as possible before the honey flow.

Now, I do not believe in spreading brood in the spring at any time before the honey season opens. It is a mistake, and you will all find it out. Neither do I believe in any device between the top bars and packing for passage ways for the bees, either winter or spring. It has ruined more colonies of bees in winter quarters, I believe, than mice and starvation together.

## REPORT OF COMMITTEE ON LEGISLATION.

In justice to the Parliament of Canada I am forced to believe it my duty to point out the difficulties and obstructions that came up in the way of at once giving the legislation sought.

Again, this Association has a right to demand of me an account of how I discharged my duties and why I spent so much money on them. Briefly then: I started on the 24th day of January, 1896. I had been at Ottawa but a short time when I was made acquainted with the fact that the members had been liberally supplied with a pamphlet against our Bill which was read, or portions of which were read and quoted on the floor of the House as authority. This pamphlet set forth that "the law was sought for selfish ends," that "it is wanted as a weapon and a menance to keep an upstart clique in power," and other base motives were given as reasons for seeking legislation. Great effort was made to lead the Parliament to believe that only a few bee-keepers, a mere "clique," care anything about the legislation sought, and that the motives of this few are low and mean in the extreme.

Then my reputation was assailed, and the statement was circulated that such "blind guides as Mr. Pettit will stick at nothing to damage any man's reputation who advocates sugar honey or dares to differ from him in any way."

Then, again, beside the two opponents from our own ranks, there was a representative of an adulteration firm said to be located in Montreal. I had not the pleasure of meeting the gentleman, but I learned from good authority that he was very much afraid of our Bill, and said if it became law in its then present state it would simply close up that branch of their business. I have given these particulars that you may understand some of the difficulties and obstructions to be overcome before we could hope to get anything done for us. Now, all this meant lots of hard work or lose the game, and I determined to work and win.

For thirteen days I remained at the capital, and pushed the matter with all my might. It was uphill work but I worked with a will, as though dear life hung upon success. There would be no difficulty at all in securing an Act that would compel all mixers and producers of sugar honey to set forth in a conspicuous manner on every container the composition of such parcel or package. Indeed a good many members urged me to accept such a Bill.

I distinctly remember a half hour's talk with a good old senator who wanted me to accept such an Act, but when among other things I pointed out to him the danger to our good name and reputation as a pure food producing country in foreign markets, he declared we should put our foot upon all adulterations. He said, "If the Bill passes the House of Commons then I will support it."

The penalties were mysteriously dropped out of the Bill between the first and second readings. The House had no opportunity of discussing them at all.

Mr. Sproule said that if the penalties in the Adulteration of Foods Act were found to be insufficient, then it would be an easy matter to get the Act amended and the penalties made heavier.

Our Bill was somewhat mutilated before it became law, but I am glad to say it is a long stride in the right direction. Indeed I believe it to be the best law in any country against that abominable adulteration business.

The Act brands "sugar honey" as a wilful adulteration, and forbids the sale of it; it also forbids the sale of spurious honey and imitations of honey. Right here I may be allowed to say that Mr. Sproule is a better man when he gets right down to business in pushing a Bill through than one would take him to be. He is quick, alert, shrewd, well posted, vigilant, and withal courteous, kind and convincing, and never mixed. Indeed, it was not only a feast but a marvel and an inspiration to hear him push the Bill through. If we stand to our guns and quit ourselves like men, in the near future we will surely get all we ask for; but for the immediate present I think we had better test what we have.

I presume most of us know that there are but few Acts passed in any country found to be so perfect that they do not want amending sooner or later.

If space would permit I would like to mention the names of Mr. Sutherland, Mr. McNeill and others as giving valuable assistance in passing the Bill.

One thing that perplexed the honorable gentlemen a good deal was an idea that was circulated by some means or other from some source that bee-keepers generally in poor seasons were in the habit of producing "sugar honey," so called, for the use of their own families. This damaging untruth was sprung upon the House so late that I had but little opportunity to make the truth known.

And now I most sincerely thank you for the confidence you have continued to place in your deputation during all these years. I have all along done the very best I could to carry out your wishes in this important matter. My faith in the eternal justice and ultimate success of our cause never waned or weakened for a moment. Truth and justice must triumph in the end.

I have visited the capital six times, have travelled 4,500 miles, and adding the distance I have travelled to report, makes in all about 5,100 miles. I was on the road and at Ottawa fifty-four days; have written hundreds of letters and other matter in the prosecution of this work. I have carried this weight and responsibility nearly four years. Indeed it has been the greatest struggle of my life, but I have done it cheerfully and gladly.

All of which is respectfully submitted.

S. T. Pettit.

Belmont, Ontario, Can., December 7th, 1896.

On motion of Mr. Evans, seconded by Mr. Hughes, the report was adopted.

Mr. Holtermann: We would like to know if, in connection with the foul brood experiments, there is any particular line we are not working in at present you would like us to undertake

Mr. Evans: I understood from the report that formic acid had the effect of reducing the growth of this disease. Would it not be a good experiment to take a foul brood colony and increase the quantity of formic acid in the honey fed to them and ascertain whether it would ultimately have the effect of destroying the foul brood, or see to what extent it could be safely fed?

## DIRECTORS' REPORT.

Your directors have endeavored during the year to assist the members of the Association and bee-keeping industry of the Province by appropriating the funds of the Association in several ways. The members of the Association were each given *The Canadian Bee Journal* as a bonus for their membership fee.

There were grants given to the Toronto Industrial Exhibition Association of $25; to the Western Fair Association at London, of $10; to the Canada Central Fair at Ottawa of $5. These grants were given for honey prizes for bee-keepers' supplies as well as for the different uses of honey.

There was a grant of $200 to the affiliated societies, this amount to be expended by the different societies as called for in the by-laws.

The members of the Association have also been supplied by the Ontario Government with the annual report.

Also the Association applied to the Agricultural Department of the United States at Washington for a Bulletin on "Bees and Bee-Keeping," by Frank Benton. We believe that through the influence of Mr. McKnight these bulletins were supplied to our members, as the names and addresses of all were sent to the Department at Washington for the purpose.

We are pleased to learn that the honey flow of the past season was very good all over the Province, and that the quality of it is of the finest.

W. Couse,
Secretary.

On motion the Directors' report was received and filed.

Mr. Holtermann moved, seconded by Mr. Best, that it is the sense of this Association that it is desirable to have an Order-in-Council passed fixing the percentage of water permissible in honey, and that this matter be left in the hands of the executive committee.

The President put the motion, which was carried, seventeen voting for the motion and eight against it.

The Secretary moved, seconded by Mr. Holtermann, that the words "in the month of December" be inserted in the motion passed fixing the next place of meeting at Hamilton. Carried.

After discussion, Mr. McEvoy moved, seconded by Mr. A. Black, that the Association take the *Canadian Bee Journal* again, and that it be given to the members.

Mr. McKnight moved in amendment, seconded by Mr. Walton that this matter be left entirely in the hands of the Board of Directors. Lost.

The main motion was then put and carried.

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## WORMS IN THE COMB.

Q. Can anyone give a remedy for the destruction of the small wax worm, principally in section honey?

Mr. Holtermann: I think the Association will agree with me in saying if you go over your sections and remove those sections that have pollen in them you will find no difficulty in connection with the bee moth.

Mr. Heise: I think I know the gentleman who put in that question. The worm he is bothered with is not the ordinary moth worm—it is a very small worm. I have seen

several sections, as many as a dozen, and he tells me he had a great many more destroyed by a very small worm that works on the cappings of the honey. The worm I have seen does not exceed three-sixteenths of an inch in length and is about as fine as a thread.

Mr. HOLTERMANN: I would advise that a sample be sent to the College at Guelph and also to Ottawa.

Mr. SWITZER: I have noticed a moth this summer; it is a smaller worm than the common bee moth, and it works on the surface of the comb. It is of a pinkish color; some of them perhaps would be half an inch in length.

Mr. PETTIT: What becomes of them in the end?

Mr. SWITZER: I don't know; I didn't wait. I have destroyed any that I have discovered, but I am satisfied they are not the common bee moth. They do not burrow through the combs like the other, but they work on the surface, on top, and they have a webby formation a good deal like a caterpillar, but it is all on the surface. I saw it in two or three hives that had become queenless, and the bees had died out in the fall and left the combs. There was no honey of any kind left in them, but there was some pollen.

Mr. BEST: The suggestion of Mr. Holtermann would certainly settle that to the satisfaction of all.

Mr. MCKNIGHT: Is there anybody present that has ever suffered the loss of one section of honey in one year from the bee moth?

Mr. CEMMELL: I never did.

Mr. HEISE: I had it this year with not a particle of pollen in the section.

Mr. ARMSTRONG: I have seen this pinkish worm as long as ten years ago.

Mr. EVANS: I have the idea that the moth was the one that burrowed in the comb, but that this other was simply a wax-worm.

## GOVERNMENT LECTURERS ON BEE-KEEPING.

Q. Is the action of the Government in sending out bureau lecturers beneficial or detrimental financially to us?

Mr. MCKNIGHT: I don't think it is of any advantage.

Mr. HOLTERMANN: I have been out on Farmers' Institute work during the past week and, as you know, bee-keepers have had a good deal of difficulty in getting the public to understand that they should not spray during fruit bloom. Now, one of the subjects that I as a rule take up is the relation of the bees to plant life. That subject can be brought forward, and every day we are finding more and more the very important part that the bee is playing in relation to horticulture. Prof. Fowler delivered a very able address in Kingston before the Fruit Growers' Association upon this subject. Take, for instance, the Northern Spy apple and plant it alone and you cannot get a single Northern Spy apple. We know for years that the whole construction of flowers was such as to secure cross fertilization, but we did not know, until investigation had been conducted, the greater importance of this question—that pollen, although mature, from a Northern Spy apple could not fertilize the corresponding part of the flower, and the necessity of having these two varieties mixed together. One of the desirable things to advance the cause of the bee-keeping industry is to bring that before the general public, then to point out that the fruitgrower and the beekeeper are a class of men who should be united, who have a common interest, and then to point out to the reports of the Entomologists, whose duty it is to study the habits of the injurious insects, and say "You cannot reach these if you spray during the time the trees are in blossom; more than that, parts of the flowers are so delicate that you run the chance of injuring those parts, and not alone have you lost your time and your material, but you are actually running the risk of injuring your flowers, and you will not get the same amount of fruit."

Mr. McKnight : Do you mean to say that a Northern Spy apple tree has not in its flowers the power to fertilize its fruit ?

Mr. Holtermann : Most assuredly.

Mr. McKnight : You have no authority to say that.

Mr. McEvoy : In my locality Prof. Shaw set out twelve acres of pure Northern Spies sixteen years ago, and this year, this great fruit year, there was not an apple on the twelve acres.

Mr. Gemmell : There are any amount of Northern Spy apple trees that do not bear till they are twenty years old.

## WINTERING BEES.

Mr. Hoshal at this point answered some questions on wintering bees in shallow frames.

Mr. McEvoy : I think it was generally the opinion here last night that by keeping the brood so close to the super, when the honey season ended there would be nothing in the brood chamber ; and what is Mr. Hoshal going to do in the winter ? Is he going to resort to feeding ? On that ground the members here would imagine that would be a poor system to follow, but Mr. Hoshal did not explain how he provides for that.

Mr. Hoshal : There are two ways I provide for that. If you wish to winter upon natural stores during the summer season, we have one of those brood cases filled with honey, which is our extracting super ; the brood case and extracting super are the same thing. We simply set that aside, and when the fall comes and the hive is stripped we put it on top and the bees go into it

Mr. McEvoy : Do you put a half story on, or do you winter in those shallow hives ? Could you winter on a single Hedden hive ?

Mr. Hoshal : Certainly, we do it winter after winter and have done it since 1887, colonies up to 80, 90 and 100, right straight along both inside and out, but remember those sections are full of honey, all the honey the combs will carry ; there are no vacant combs or anything left in them for the bees to stick their heads into ; it is all filled They are filled, whether they are full of natural stores or whether the bees are fed with syrup in the fall for them to fill them up. I have better results where we use two cases or ten Langstroth frames ; we have very strong colonies, and when those colonies winter well they certainly beat those that are wintered in single sections. But those colonies that are wintered in two sections vary a great deal ; some of them will be real strong, the same as they went into winter quarters, and some will be reduced until they are very weak, and they are in all degrees of strength from that up. Those wintered in single sections are more uniform throughout, and pretty much the same as you put them into winter quarters. Another point I would like to emphasize is the feeding in the fall. It seems to me the Association looks upon it as a tremendous job to feed bees. To me this is one of the simplest things in the world. It would make very little difference in the work between supplying them with a case filled with honey or supplying them with liquid food to be taken up from the feeder. I use a bottom feeder ; it is a Hedden feeder, put underneath the hive and arranged with a rim so that it can be used there. It is simply a matter of lifting the single case from the bottom board and setting the feeder on it, and then in the evening, just about sundown, weighing out the amount of syrup that your bees want.

Mr. Holtermann : When you are putting that half-storey in the cellar how do you prepare it, and how does it stand in the cellar ? What is there on top and what underneath ?

Mr. Hoshal: I have tried that two or three ways. We have a couple of triangular blocks cut in the winter time. There is a stand, first of all, on the cellar and the hives are piled four deep on top of that with the bottom board on. I have tried just leaving them stay there without anything else. We have no cover on them, nothing but the regular outside cover and the bee space between sealed down tight; the only difference outside of that is to take the front part of the hive from the bottom so as to lift the space between it and the bottom board up, simply prying it up and slipping under one of those entrance blocks, which will be about two inches.

Mr. Gemmell: Do you put any rim underneath them outside?

Mr. Hoshal: No.

Mr. Walton: When they are in the cellar will they not do with their natural entrance?

Mr. Hoshal: I have wintered them two ways—one with the full entrance to the hive, with the entrance block off; another way is, I raise it up from the bottom; I really could not see any difference one way or the other, and I have simply come back to the way I do in the summer. Those wintered in the single sections were more uniform than those wintered in two.

Mr. Holtermann: I must confess that I have never quite accepted that theory. So long as bees are wintered properly the queen will not want to breed, and if you have to use that means, that is, give them no empty cells, it would be to me an indication of wrong wintering; and then your bees are beginning to consume, and as they begin to breed there will be a larger number of cells becoming vacant and a greater amount of room. I would rather think that the strength of a hive lies in this, that your queen has not the desire to lay and does not lay for that reason; but your stores, in the condition in which Mr. Hoshal mentions, are well covered by the bees. You know that if a portion of that hive is away from the bees, the bees throw off moisture and that becomes cool, and that moisture from the bees is absorbed by the honey that is not covered by the bees and the stores become sour, and of course deterioration sets in. Is not that the case? Is not this also the case, that as the bees winter poorly they become restless; they consume more stores and at the same time there is a loss of vitality going on? The result is that brood rearing sets in, and that would appear to some to be an effort of nature to replace that lost vitality, and not being able to fly when they are brood rearing, that instinct is only intensified.

Mr. Hoshal: In stating what I have to-day, I am simply stating facts—I am advancing no theory; but, as it comes up, I might state that one of the things to be kept in view in wintering bees, no matter whether it is a Hedden hive or any other hive, is to make the hive of such a capacity that the bees that are wintered in it will fill it and entirely cover all the combs; that is, there is no space inside but what is occupied.

Mr. Gemmell: I think the question was asked last night, whether bees could be wintered on such shallow cases as five inches deep? Of course they can. If you do not believe it just try it. I have done it, and I never had bees winter better.

The President: We have the honor of having with us His Worship Mayor Fleming, of Toronto. We are certainly pleased to have him with us. I presume the time at his disposal is very limited, but I have no doubt he would like to say a few words to us, and I am sure it would be a great pleasure to you to listen to whatever he may have to say.

Mayor Fleming then delivered a hearty welcome to the Convention, and was replied to in an equally cordial manner by Messrs. McKnight and Evans on behalf of the Association.

After votes of thanks to the press for good reports of the proceedings, the President declared the Convention closed.

BY-LAWS.

1. This Association shall be known as the Ontario Bee-keepers' Association, and shall be composed of those interested in bee-keeping who become enrolled as members by paying the annual membership fee of one dollar.

2. A general meeting of the members of this Association shall be held once a year, and shall be known as the Annual Meeting, the year to begin with the election of officers at such Annual Meeting and terminate on the election of their successors at the next Annual Meeting. At this Annual Meeting, or at any other general meeting of the members of this Association, ten members in good standing shall constitute a quorum.

3. The time and place of holding the next Annual Meeting shall be fixed by the members present at the Annual Meeting.

4. The Board of Management shall consist of a President, two Vice-Presidents and nine Directors, elected one from each of the following twelve divisions :—

Division No. 1.—Stormont, Dundas, Glengarry, Prescott and Cornwall.

Division No. 2.—Lanark, Renfrew, Carleton, Russell and Ottawa.

Division No. 3.—Frontenac, Kingston, Leeds, Grenville and Brockville.

Division No. 4.—Hastings, Addington, Lennox and Prince Edward.

Division No. 5.—Durham, Northumberland, Peterborough, Victoria and Haliburton.

Division No. 6.—York, Ontario, Peel, Cardwell and Toronto.

Division No. 7.—Wellington, Waterloo, Wentworth, Dufferin, Halton and Hamilton.

Division No. 8.—Lincoln, Niagara, Welland, Haldimand and Monck.

Division No. 9.—Elgin, Brant, Oxford and Norfolk.

Division No. 10.—Huron, Bruce, Grey and Perth.

Division No. 11.—Essex, Kent, Lambton, Middlesex and London.

Division No. 12.—Algoma, Simcoe, Muskoka, Parry Sound, Nipissing and Manitoulin.

Also one Director from the Ontario Agricultural College and Experimental Farm. The Board of Management so elected shall appoint from among themselves, or otherwise, a Secretary and a Treasurer, and shall also appoint at least three of their number as an Executive Committee.

5. Five members of the Board shall constitute a quorum.

6. Vacancies on the Board by death or resignation may be filled by the President, subject to the approval of the Executive Committee.

7. The officers of this Association shall be elected by ballot, with the exception of the Auditor, who may be elected by an open vote of the Association.

8. It shall be the duty of the President to preside at all meetings of this Association; to call for reports; to put motions when seconded; to decide upon questions of order and to declare the result of ballots and elections. The President, in connection with the Secretary, shall have power to call special meetings when necessary. The President shall be *ex-officio* chairman of the Board of Directors, and shall call it together when necessary.

9. In the event of the death or absence of the President, the Vice-President shall discharge his duties.

10. It shall be the duty of the Secretary to keep and preserve the books of the Association; to call the roll and read the minutes at every meeting of the Association; to conduct all correspondence of the Association; to receive and transfer all moneys received for fees and otherwise to the Treasurer, having taken a receipt for the same; to make out a statistical report for the Association and for the Government; to furnish the officers of the County and District Associations with forms for organization and annual reports, and to give notice of Association and Board meetings through the press or otherwise.

11. It shall be the duty of the Treasurer to furnish such securities for the moneys of the Association as the Board may determine; to receive from the Secretary all moneys belonging to the Association and to give receipts for the same; to pay them out on order endorsed by the President and Secretary, and to render a written report of all receipts and disbursements at each Annual Meeting.

12. Any County or District Bee-Keepers' Association in the Province of Ontario may become affiliated to this Association on payment of five dollars, which shall be paid to the Secretary on or before the first day of June in each year; but every local Association so affiliated must have on its membership roll at least five members who are also members of the Ontario Bee-Keepers' Association at the time of its affiliation, and must continue to have a like number of its members on the roll of this Association while it remains in affiliation.

13. Every affiliated Association shall receive an annual grant out of the funds of this Association. The amount of such grant shall be fixed by the Board from year to year.

14. All grants to affiliated Associations shall be expended in prizes for honey shows, or for shows of apiarian appliances, or for lectures on subjects pertaining to bee culture, or for advertising district or county meetings, or for any or all of these, and for no other purpose.

15. Every affiliated Association shall report to the Secretary of this Association (on a form to be supplied by the Secretary) before the first day of December in each year, which report shall be signed by the President and Secretary of the affiliated Association.

16. County or District Associations seeking affiliation should forward to the Secretary an application according to the following form:—"We, whose names are written in the accompanying form, having organized ourselves into a County (or District) Association to be known as County (or District) Association No. —, desire to become affiliated to the Ontario Bee-Keepers' Association, and we agree to conform to the Constitution and By-Laws of said Association."

Form of application as follows:—

| Names of those already Members of O. B. K. A. | P.O. Address | Fees. | Names of those not already Members of O. B. K. A. | P.O. Address | Fees. | Remarks. |
|---|---|---|---|---|---|---|
| | | | | | | |

17. Every affiliated Association that neglects or refuses to pay the annual affiliation fee, or neglects or refuses to forward to the Secretary the annual report on or before the date fixed, may be deprived of their affiliation privileges by the Board.

18. Should an affiliated Association become defunct after the payment to it of the grant from this Association, any unexpended balance of said grant shall be forfeited and paid over to the Treasurer of this Association.

19. Each affiliated Association shall be entitled to the privilege of two representatives at the meetings of this Association in addition to those who are already members of this Association, and such representatives shall be entitled to all the rights and privileges of members of this Association.

20. Every delegate from an affiliated Association shall furnish to this Association a certificate, signed by the President and Secretary of the body which he represents, showing that he has been duly appointed a delegate of such Society.

21. Each affiliated Association shall be entitled to the services of an Association lecturer (when such exists) once in each year, half the expenses connected with such lecture to be borne by the District or County Association and half by this Association.

22. The order of business by which the meetings of this Association shall be governed shall be in the discretion of the President, but subject to appeal to the meeting when objection is taken, when a majority vote of the members present shall decide on the objection, and in such cases the vote of the majority shall be final.

23. These By-Laws may be amended by a majority vote of the members present at any Annual Meeting, or at a special meeting of the members called for the purpose of considering the same, and of which at least two weeks' notice shall be given by public advertisement.

# ANNUAL REPORTS

OF THE

# POULTRY AND PET STOCK ASSOCIATIONS

OF THE

# PROVINCE OF ONTARIO

# 1896.

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*(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)*

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1897.

# ANNUAL REPORT

OF THE

# POULTRY ASSOCIATION OF ONTARIO.

## 1896.

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*To the Honorable the Minister of Agriculture:*

DEAR SIR,—I have the honor of submitting herewith the Twenty-Third Annual Report of the Poultry Association of Ontario.

Yours very truly,

THOS. A. BROWNE,
*Secretary.*

# POULTRY ASSOCIATION OF ONTARIO.

## OFFICERS FOR 1897.

| | | |
|---|---|---|
| Mr. Allan Bogue | London | *President.* |
| Dr. Mallory | Colborne | *1st Vice President.* |
| Mr. Chas. Bonnick | Toronto | *2nd Vice-President.* |
| Mr. Thos. A. Browne | London | *Secretary.* |
| Mr. Geo. G. McCormick | London | *Treasurer.* |

*Directors:*

| | | |
|---|---|---|
| Mr. D. C. Trew | Lindsay | District No. 5. |
| Mr. A. W. Bell, M.D | Toronto | " No. 6. |
| Mr. T. J. Senior | Hamilton | " No. 7. |
| Mr. M. T. Burn | Tilsonburg | " No. 8. |
| Mr. T. H. Scott | St. Thomas | " No. 9. |
| Mr. Chas. Massie | Port Hope | " No. 10. |
| Mr. Wm. McNeil | London | " No. 11. |
| Rev. J. H. Scott | Ridgetown | " No. 12. |
| Mr. W. J. Bell | Angus | " No. 13. |

| | | |
|---|---|---|
| *Delegates to the Industrial Exhibition, Toronto* | Mr. Jos. Dilworth | Toronto. |
| | Mr. Wm. Barber | " |
| *Delegates to the Western Fair, London* | J. H. Saunders | London. |
| | Geo. G. McCormick | " |
| *Delegates to the Central Fair, Hamilton* | Rev. Thos. Geoghegan | Hamilton. |
| | John Cole | " |

# LIST OF MEMBERS FOR 1897.

| Name. | Post office. | Varieties exhibited. |
|---|---|---|
| Arthur, James | London | Silver Wyandottes. |
| Anderson, James | Guelph | Bronze Turkeys. |
| Anderson, W. M. | Palmerston | Indian Game and A. O. S. V. Game. |
| Barber & Co | Toronto | All varieties of Game and Game Bantams. |
| Bell, A. W | Toronto | Buff Cochins, Partridge Cochins. |
| Bennett, J. E | Toronto | Barred Plymouth Rocks. |
| Bogue, Allan | London | Hamburgs, Dorkings, Houdans, Polands, Toulouse Geese, Aylesbury, Rouen and Pekin Ducks. |
| Brown, Thomas | Durham | Black Javas. |
| Beattie, W. H | Wilton Grove | Barred Plymouth Rocks, Bronze Turkeys and White or Black Turkeys. |
| Blyth, A. W | Marden | Golden Wyandottes. |
| Baulch, S. F | Woodstock | Buff Leghorns. |
| Bell, W. J | Angus | Pyle Bantams, White Leghorns Bronze Turkeys. |
| Brierly, George | Guelph | S. C. White Leghorns, S. C. Black Leghorns. |
| Berner, G | Guelph | Buff Leghorns. |
| Brown, A. G | Watford | Black Leghorns. |
| Bruce & Acres | Hamilton | Black Langshans and Black Javas. |
| Bogue, George | Strathroy | White Plymouth Rocks, Silver, Black and White Wyandottes, Dominiques, A. O. V. Ducks. |
| Bonnick, Chas | Toronto | White Plymouth Rocks and Brown Red Bantams. |
| Baulch, J. H | Port Hope | S. F. Tumblers, White and A. O. S. C. Trumpeters, and Dragoons. |
| Barnard, John | Wroxeter | Black Langshans and Black Minorcas. |
| Colson, John | Guelph | Plymouth Rocks (Barred, White and Buff), Rouen and Pekin Ducks. |
| Crowe, John | Guelph | Black Red Game. |
| Crowe, C. R | Guelph | Black Red Game Bantams. |
| Cosh, Newton | Woodstock | Andalusians. |
| Corcoran, J. L. | Stratford | Partridge Cochins, Silver Grey and Colored Dorkings, Black Spanish, Black Minorcas. |
| Cameron, John | Galt | Light Brahmas. |
| Cole, John | Hamilton | Light Brahmas. |
| Chamberlain, Geo | Guelph | Pyle Game. |
| Coulter, D. M | Amulree | Black Leghorns. |
| Clemo, S. M | Galt | Light Brahmas, Plymouth Rocks (Barred and White), A. O. V. Bantams, Wyandottes (Black and White), Cross-bred Chicks. |
| Donovan, H. B | Toronto | Cochin, Polish and A. O. V. Game Bantams, and a large assortment of Pigeons. |
| Dickenson, — | North Glanford | Barred Plymouth Rocks. |
| Dundas, James | Deer Park | Buff Leghorns and Black Minorcas. |
| Dinner, Richard | St. Thomas | Indian Game. |
| Dunn, G. J | Hamilton | Pigeons, several varieties. |
| Doyle, H. G | Woodstock | White Pouter Pigeons. |
| Dewey, E. J | Toronto | Black Langshans. |
| Dorst, Jacob | Toronto | Silver and Black Wyandottes. |
| Drew, C | Guelph | Poultry feed. |
| Eisiel, C. J | Guelph | Buff Cochins and Buff Cochin Bantams. |
| Essex, Robert H | Toronto | Buff Plymouth Rocks. |
| Foster, Joseph | Brampton | W. Cochins, W. Plymouth Rocks, Indian Game, Silver Grey Dorkings, Black Spanish and Bremen Geese. |
| Fox, William | Toronto | Rabbits, several varieties. |
| Field, Fred | Cobourg | Buff Wyandottes. |
| Fraser, Alex | New Hamburg | Black Spanish. |
| Ford, James | Drumquin | Bronze Turkeys. |
| Foley, John J | Brantford | Golden Wyandottes. |
| Graham, A. W | St. Thomas | Golden Wyandottes, S. C. White Leghorns. |
| Gowman & Hortop | St. Thomas | A. O. S. V. Game. |
| Geoghegan, Thos | Hamilton | Game, Black Red and A. O. S. V. |
| Grimsley, Chas | Toronto | Black Wyandottes. |

LIST OF MEMBERS.—*Continued.*

| Name. | Post office. | Varieties exhibited. |
|---|---|---|
| Gallinger Bros. | South End | W. Plymouth Rocks, W. Wyandottes, S. C. White Leghorns. |
| Henrich, H. M. | New Hamburg | R. C. Brown Leghorns, Black Javas. |
| Horsford, G. F. | Port Hope | Buff Leghorns. |
| Hamilton, J. G. | Galt | S. C. White Leghorns. |
| Hare, F. C. | Whitby | Buff Cochins, Black Spanish, Blue Pied Pouter Pigeons. |
| Howitt, J. E. | Guelph | Ducks (A. O. V.), Red or Yellow Magpies. |
| Hart & Grimodly | Owen Sound | Pyle Bantams, Golden Sebright Bantams. |
| Howard, Robert | Guelph | Black Red Bantams. |
| James, W. J | St. Thomas | Black Red Game. |
| Jarrell, Capt. J | Port Hope | Black Minorcas. |
| Karn, H | Guelph | Black Langshans, Golden Wyandottes. |
| Kenwell, J. W | Petrolia | Plymouth Rocks (Barred and Buff). |
| Knight & Smith | Guelph | Langshans (A. O. V.), and White Wyandottes. |
| Kennedy, Fred | Malvern | White Minorcas, Black Minorcas. |
| Kettlewell, N. T. | London | White Wyandottes. |
| Kemp, R. H | Grimsby | Leghorns (White, Brown, Black and Buff). |
| Lawrie, John | Malvern | Dorkings (Silver Grey and Colored), Bremen Geese, Pekin Geese. |
| Lake, Arthur | Toronto | Plymouth Rocks (Barred), S. C. Brown Leghorns. |
| Little, A. T | Churchill | Black Langshans. |
| Luxton, A. G. H | Georgetown | W. Wyandottes, Black and Buff Leghorns, Geese and Ducks. |
| Lowell, G. J | Toronto | Incubator and Brooder. |
| Main, William | Milton West | Black Red Game, Bronze Turkeys, Bremen Geese and Rouen Ducks. |
| Magill, J. H | Port Hope | Wyandottes (Golden and Buff). |
| Magill & Gliddon | Port Hope | All varieties Pouter Pigeons. |
| Meyer, J. E. | Kossuth | Wyandottes (Golden, Silver and Buff). |
| Moffatt, J. S. | Guelph | Canaries (Belgian and A. O. V.) |
| Massie, Chas | Port Hope | White Wyandottes and a large variety of Pigeons. |
| Milton & Mitcheltree | London | Buff Plymouth Rocks, Andalusians and Houdans. |
| Modlin, John | Hamilton | Dark Brahmas, Plymouth Rocks, Indian Game and Black Spanish. |
| Mitcheltree, W. L. | London | Pyle Bantams. |
| McNeil, William | London | White Cochins, all varieties Bantams, Hamburgs and Polands. |
| McLoud, William | London | Barred Plymouth Rocks and Black Red Game. |
| McCormick & Weir | West Flamboro' | Black Red Bantams, Buff Cochin Bantams, Black Spanish, Toulouse Geese, Homer Pigeons. |
| McCormick, Geo. G | London | Buff Cochins and Black Javas. |
| McKee, John | Norwich | Dorkings (Silver Grey). |
| McConnell, R | London | Black Langshans and R. C. Brown Leghorns. |
| Niven, Dr. J. S | London | Red Caps and all varieties Pheasants. |
| Norris, Jas. E. | Guelph | White Leghorns. |
| Noden, A | Toronto | Silver Grey Dorkings. |
| Oke, Richard | London | Partridge Cochins, all varieties Bantams, Golden and Black Wyandottes, W. Leghorns, all varieties Hamburgs, A. O. C. Javas, Creve Cœurs, La Fleche, Sultans all varieties Pheasants. |
| Oldrieve & Wilkinson | Kingston | Light Brahmas, Barred Plymouth Rocks, all varieties Game, W. or B. and W. Booted Bantams, Black Langshans, Golden Wyandottes, R. C. Brown Leghorns, Black Hamburgs and Dominiques. |
| Osborne, W. M. | Brockville | Black Leghorns, Andalusians and White Minorcas. |
| O'Brien & Colwell | Paris Station | Pyle Game, Cross Bred Chicks, all varieties Geese and Ducks. |
| Patterson, W. F. | Morriston | Brown Leghorns. |
| Player, W. J. | Nassagaweya | Leghorns (Brown and Buff). |
| Parsons, J. H | Osaca | White Plymouth Rocks, Indian Game, Cross Bred Chicks and Dressed Fowls. |
| Page, J. L | Woodstock | Leghorns (R. C. Brown). |
| Pequegnat, L. G | New Hamburg | Partridge Cochins, Barred Plymouth Rocks and Indian Game. |
| Pletsch, John | Shakespeare | Barred Plymouth Rocks, White and Brown S. C. Leghorns and Toulouse Geese. |

LIST OF MEMBERS.—*Concluded.*

| Name. | Post office. | Varieties exhibited. |
|---|---|---|
| Petrie, A. B | Guelph | Poultry feed and druggist's supplies. |
| Readwin & Co | Guelph | Wyandottes (Black and White), Leghorns (White, Brown and Black), S. G. Dorkings and several varieties Pigeons. |
| Reid, W. H | Kingston | Bantams (A. O. V., W. Booted, Black Tailed Japanese), Leghorns (S. C. White), Black Javas, Houdans, Bronze Turkeys, Bremen Geese, Aylesbury Ducks, several varieties Pigeons. |
| Rice, Thos | Whitby | White Plymouth Rocks, White and Brown S. C. Leghorns. |
| Reinhart, C | Guelph | A. O. S. V. Game. |
| Scott, Rev. W. & Sons | Ridgetown | Minorcas (White and Black). |
| Saunders, Sid | Guelph | Buff Plymouth Rocks. |
| Saunders, J. H | London | Dark Brahmas and Brown Leghorns. |
| Scott, T. H | St. Thomas | Black Langshans, Black Wyandottes. |
| Sloan, W. H | Guelph | Indian Game and S. C. White Leghorns. |
| Stone, Alfred | Guelph | Barred Plymouth Rocks and Indian Game. |
| Senior, T. J | Hamilton | Minorcas (Black and White). |
| Sallows, Hy | Guelph | Pyle Game, Black Red Bantams, Pyle Bantams. |
| Sisley, F | Sheffield | Buff Leghorns. |
| Troth, F | Toronto | Duckwing Game, Pyle Game. |
| Turpin & Peters | Kingston | Barred Plymouth Rocks, Black Langshans and Golden Wyandottes. |
| Thorpe & Scott | London | Dark Brahmas. |
| Tyson, A. W | Guelph | Black Red Bantams, Buff Leghorns, S. S. Hamburgs, several varieties Pigeons. |
| Trew, D. C | Lindsay | Barred Plymouth Rocks, S. C. White Leghorns and Houdans. |
| Thorpe, Geo. J | | |
| Wagner Incubator Co | Toronto | Buff Leghorns. |
| Webber, F. R | Guelph | W. or B. (R. C. B.) Bantams, Black Javas, A. O. C. Javas, Aylesbury and Pekin Ducks. |
| Way, A. P | St. Thomas | Buff Leghorns. |
| Whillans, Geo | Toronto | Buff Leghorns. |
| Wedgery, James | Woodstock | Black Wyandottes. |
| Wilson, J. R | Toronto | Buff Wyandottes and Brown Leghorns. |
| Young, Robert | Ponsonby | Barred Plymouth Rocks. |
| Burn, M. T | Tilsonburg | Did not exhibit. |
| Dustan, Robt | Toronto | |
| Duff, Thos. A | Toronto | |
| Dilworth, J | Toronto | |
| Goebel, Fred | New Hamburg | |
| Gowdy, Thos | Guelph | |
| Gilbert, A. G | Ottawa | |
| Holten, William | Hamilton | |
| Mills, Prof. Jas | Guelph | |
| Monck, J. F | Owen Sound | |
| Peirson, James | Weston | |
| Wright, H | Owen Sound | |

# REPORT OF THE TREASURER.

Mr. Geo. G. McCormick read the Financial Report, giving a detailed account of the receipts and disbursements of the Association for the exhibition of 1896, held at Port Hope:

RECEIPTS.

| | |
|---|---|
| Balance brought forward | $123 92 |
| Ontario Government grant (discounted) | 874 75 |
| " " special grant for new coops | 500 00 |
| Entry fees (as per register) | 588 50 |
| Membership fees | 97 00 |
| Special prizes donated | 19 00 |
| Interest from bank on deposits | 6 53 |
| | $2,209 70 |

DISBURSEMENTS.

| | |
|---|---|
| Prizes paid (including P. O. commission) | $1,165 09 |
| Purchase of new coops | 487 28 |
| Port Hope Association (grant and expenses) | 103 25 |
| Judges fees | 125 00 |
| Secretary's salary (as voted by Directors) | 150 00 |
| Printing and advertising | 26 00 |
| Postage, express, telegrams, etc | 19 03 |
| Secretary's expenses attending show at Port Hope | 12 55 |
| Stenographer for Government report and minutes | 10 00 |
| Freight on return of coops to London | 23 55 |
| Balance in bank | 87 95 |
| | $2,209 70 |

GEO. G. MCCORMICK,
Treasurer.

Audited and found correct.

H. B. DONOVAN,
Auditor.

TORONTO, November 18th, 1896.

# TWENTY-THIRD ANNUAL MEETING

OF THE

# ONTARIO POULTRY ASSOCIATION.

# 1896.

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The twenty-third annual meeting of the Ontario Poultry Association was held in the City Hall, Guelph, on Thursday afternoon, January 14th, 1897, at two o'clock.

The President, Mr. THOS. GOWDY, took the chair.

The Secretary, Mr. T. A. BROWNE, read the minutes of the last annual meeting and the intervening meeting of the Board of Directors.

Mr. WAGNER called attention to a mistake in the minutes in speaking of "solid turbet pigeons." There was, he said, no breed of that name. The Secretary stated that he believed it was an error. Mr. Wagner and Mr. Donovan both thought it should read "black and any other color," and on motion it was decided to correct the minutes to read in that way.

Moved by Mr. Alex. GRAHAM, seconded by Mr. JAMES ANDERSON, that the minutes as read be adopted. Carried.

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## NEXT PLACE OF MEETING.

Mr. BROWNE said he had been asked by some of the members to take up as the next item of business the question as to where the next annual meeting should be held, as some present had to leave by an early afternoon train. On a vote being taken it was decided to make the change, and take up this question at once.

Mr. ALLAN BOGUE moved that the city of London be selected.

Mr. ESSEX took great pleasure in nominating the city of Toronto for the show to be held in 1898. He thought the members from Toronto were perfectly justified in asking for it. The show had not been held in Toronto for fifteen years, and during that time London had had it twice.

It was moved by Mr. TREW, seconded by Mr. ESSEX, that the vote be taken by ballot. Carried.

Mr. MCCORMICK moved that Mr. Trew and Dr. Mallory be appointed scrutineers. Carried.

The vote being taken, the scrutineers reported that the result was London 42, Toronto 37.

Mr. ESSEX moved that the vote be made unanimous. This was seconded by Mr. BARBER and carried amid great applause.

## THE USE OF SCORE CARDS.

Mr. CROWE moved, seconded by Mr. BARBER, that at future exhibitions of the Society the score card system for judging be abolished. A long discussion was the result.

Mr. BARBER spoke strongly in favor of judging by comparison, as did also Mr. Bonnick.

One member favored the score card because it enabled one to find out the defects of his bird, and was thus a means of education, especially to the young breeder.

Secretary BROWNE said the score card system was very unsatisfactory, but as it was a very radical change to make, he thought it should be thoroughly discussed before being finally settled. The birds at the Western Fair were judged by comparison, and the work was done in a satisfactory manner, and a great deal more quickly than would be possible if the other system were used.

Mr. ANDERSON said that the tickets were not upon some of the birds yet, and this should not be.

Mr. MCCORMICK said his experience, extending over a great many years, was that the score card was a total failure. All the large shows in the States found it impossible to do the work, otherwise than by the comparison system, and get it done in the proper time, and exhibitors especially wanted their tickets up the first day.

Mr. BOGUE said the score card would have to go before long, but as the Minister of Agriculture favored it as a means of education he thought it would be well to move slowly.

Several members spoke in favor of the present system.

Dr. MALLORY would adopt the comparison system, but if it was decided to make the change he thought that a provision should be made that any person wishing to have his birds judged, and a card given, might have this done on payment of a nominal fee, and he moved that such a provision be made and that the fee be 10c for each bird so judged. This was seconded by Mr. TREW and carried unanimously.

Mr. OLDRIEVE moved that notice should be given to the Secretary, when the entry was being made, of any case where the scoring card would be required. It was also moved that the scoring in each department be done by the judge in that department. Both motions were carried.

Mr. BROWNE moved, seconded by Dr. MALLORY, that all such points be left to be dealt with by the Executive. Carried.

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## REPORT OF THE SECRETARY.

It is not necessary, nor is it my intention, to take up much of your valuable time by any lengthy report upon the progress of this Association from year to year. Let it be sufficient to say I know of none, nor do I hear or read of any, that can outstrip us in Canada as a successful Association, and I for one am proud of the increased efforts made by you this year, as it proves your confidence in the Directors and officers of the Association.

Perhaps in no other way is our progress more noticeable than in the improvement of our Annual Exhibition of poultry, and the valuable information that goes forth from the annual meetings of the Association to the farmers and those interested in the poultry industry throughout this Province and elsewhere.

But we have not accomplished all we could have, and perhaps should have done, and I believe there are great opportunities for us still to make a very marked improvement in this respect. And here let me ask your indulgence for the suggestions I purpose offering for your consideration and discussion to-day if the time permits, my only object being the advancement of this Association, and to try and remedy the mistakes, if mistakes there be.

My intention is merely to mention them, and leave the solution of them with the members present.

Since accepting the position of your Secretary, I have noticed that it is a very hard thing indeed for our Directors to stand prosperity in the financial condition of the Association, for no sooner is a small surplus acquired than they feel in duty bound to make use of it. There is nothing wrong about that, but the way in which it is used. Complaints have been made that they keep adding new varieties to the prize list, many of them comparatively useless, when compared with others not yet included.

It seems to me that all varieties have their usefulness, and I would like if we were in a position, to have all represented in our prize list. My opinion, however, is that the first thought should be to consider the most useful varieties to our country as "bread-winners" or "produce agents," and we should more generously provide for dressed fowls, as they make a magnificent display, besides being a leading feature in the export of this country. In this matter we should look for additional help.

My second is the outcome of the first, viz., that we should be more considerate of what we can do, and are expected to do, for others, rather than to always get for ourselves. What I am trying to say is that we should be more "educational." We should in some way get more of the members or others to provide us with essays and addresses on this the greatest industry of the Dominion (or within one of it), by offering prizes, or some other inducements for this purpose. We have had many very good ones in the past from the members, and to-day have more, and perhaps a better assortment than at any other time, and no doubt we will always have more or less, but under existing circumstances this is not a certainty, as some of our members have been appointed to the position of "poultry lecturers" for the several districts of the Province, and others are contributors to the poultry journals of the country. For both of these positions no doubt they receive remuneration, and they *may* not feel inclined to assist gratis.

And again, others there *may* be who do not feel like taking the time for preparation or giving away such information as they possess, without some chance at least of remuneration.

To overcome these apparent future difficulties, and also to increase the interest in our meetings, I would suggest that we offer suitable prizes, say for the best, or first, second or third essay for the exhibition of 1898, this Association to name six or more subjects, the competitors taking their choice, the essays to contain, say 1,000 words or more, quality not quantity to govern; all essays to be the property of the Association, and to be submitted to the Department for publication in our Report or not at their discretion. The judges to be the Minister of Agriculture or his Deputy, one of our judges, and the President of the Association. (Named herein merely for consideration.)

Third. I do not think we devote sufficient time during exhibition week to our meetings, but incline rather much to the social evening elsewhere. While I cannot but acknowledge with heartfelt thanks the oft repeated kindnesses of the local Associations where we have been, in providing entertainments for us and friends, and at which I most thoroughly enjoyed myself, still I think we should have another afternoon and evening, if necessary, or the morning of Thursday, if you think best to make one day of it, for the essays and their discussion, apart from the regular business, either those read at the present or past meetings, and also invite questions to be answered thereat. I am satisfied that in expressing your views you would certainly assist your fellow fanciers.

Fourth (and last). This I know must be handled very carefully—the judging of our shows. While I have nothing to say against the ability, or the impartial judgments rendered by those gentlemen who serve us faithfully and well year after year, nor have I any intention to cast any reflections whatever on those gentlemen or their work I cannot help thinking that an improvement would be made by either having additional judges, or having the work done by comparison, and at the same time provision should be made to prevent an exhibitor, or any other person, from standing around the judges while in the discharge of their duties. You are well aware that the Secretary hears more complaints than any other half dozen persons connected with these shows; all complainants come to him, his

opinion is asked and his help solicited. For such reasons as these already mentioned and others of personal observation, I have concluded that it would be in the interests of every one concerned if this matter were carefully considered by your new Directors, with the object of improvement. In the first place it would expedite matters. Exhibitors would get the benefits accruing from their honors earlier, making some sales which they now lose under present arrangements. As it is now, it is Friday, the last day of the show, before many are judged, and then necessarily in a very hurried manner. This, as you are all aware, is a fact, because at each Annual Directors' Meeting there is a resolution passed that the judges commence on such and such varieties, and not leave them until the last day, as was the case last year. And what will it be if the Show keeps on the increase, as it has for the last few years? Some change must be effected.

I will give a short comparative statement and close. Those of you who attended the Show of 1896, in Port Hope, will remember that the opinion expressed by all was "That never had a finer poultry show been held under our auspices." With the new coops, the spacious hall, good light day and night, the ever obliging superintendent, and the courteous President and local members, it never had been better, and it was doubtful if it ever would be surpassed.

Well, here we are to-day—another year has passed away—only one. The same coops and more, besides a good hall well lighted, a superintendent just as good (but no better), a President and local members all that could be desired, the same judges with a larger entry in most of the varieties, particularly the heavy fowls, making the total the largest in the history of the "Ontario" as far as known to me. I miss from amongst us some of the old standards, C. J. Daniels, W. R. Knight, T. A. Duff and many others, but on the other hand, we have a much larger increase of new blood. See that we use them right.

In 1896 we had: Fowls, 1,035; Turkeys, 12; Geese, 14; Ducks, 33; Pheasants, Pigeons and Pets, 180; Total, 1,274; Membership, 102.

At the present Show we have: Fowls, 1,211; Turkeys, 36; Geese, 48; Ducks, 70; Pheasants, Pigeons and Pets, 257; Total, 1,622; increase over last year, 346. Membership, 139; increase over last year, 37.

I wish also to compliment the local association in their arrangement of the special prizes, which have been placed, to my mind, in the proper way to bring out competition. The increase in the entry this year is largely due to their foresight. It also gives a large number of exhibitors an opportunity to compete, and those who win do so by merit, not, as too often is the case, being given to some special variety and sex, the winner of which could be generally located before the judging took place. I trust their successors will follow their example, only in an increased degree.

In conclusion, if what I hear is true, and circumstances seem to indicate it is the majority's wish, then I can promise you that the present and all past efforts will be as nothing when we see the Ontario Show of 1898, and I trust that we may all be spared to meet together in London, or if not there, wherever the meeting may decide.

Now gentlemen, I have had my say, and I know that you are all well enough acquainted with me to know that it is purely for the improvement of the Association that I submit the foregoing suggestions. It is for you to say whether they are required or not.

Thanking you for your kind attention, and wishing you a happy New Year

THOS A. BROWNE,
Secretary.

## HINTS FOR FUTURE ACTION.

By Dr. James Mills, President Ontario Agricultural College, Guelph.

It gives me great pleasure to meet the members of this Association. I have not before had an opportunity of coming thus into contact with the men who have done so much to advance the interests of poultry raising in this country. I came to the conclusion some few years ago that the men engaged in this industry were, generally speaking, pretty sharp, enterprising men; hence it gives me great pleasure to have this opportunity of meeting you.

I wish also to congratulate the Directors of this Association on the excellent show you have this year. I feel I cannot do so too warmly, and this is not my own judgment alone, but the judgment of others who are well qualified to speak. But this is just what I expected to find in Guelph. I said to some members of the Fat Stock Show, when here, that it seems to me that the very atmosphere of Guelph is congenial to the shows of any kind of stock. So you may always expect a good one in Guelph. The show here now is really a credit to this Association and to the Province as well. No person going through the building can come to any other conclusion.

I want also to take this opportunity of congratulating two or three men who have done so much across the line to establish and maintain the reputation which the poultry men of this country have there. I refer to Messrs. McNeil, McCormick, Bogue and Barber, and I must say that personally, as a Canadian, I feel proud of these men and of what they have succeeded in doing. They deserve credit, and we should not fail to express our appreciation of what they have accomplished.

I would like now to emphasize the great importance of poultry raising and egg production in this Province, which seems, I am glad to say, to be extending every year. I read from time to time, with great interest, of the large quantities of poultry being shipped. No doubt when a good system of cold storage is obtained much larger quantities will be shipped. Any one who is at all familiar with farm life knows what an important factor the selling of eggs from month to month, and of poultry at certain seasons of the year, is; how large a part of the grocery bill and of the petty cash payments for clothes is thus made from year to year, and how much is thereby added to the home comforts by many worthy people of this Province. This being the case, one of the most important questions which the members of this Association can consider, is what can they do to induce the farmers to profit more largely than they now do by this branch. A man lacking experience is not in a position to dogmatize or give advice about such matters; and I would not venture to do so. But I shall lay four points, in the form of questions, before you. These are:

1. Should the largest prizes be given to those classes or varieties of fowl which admittedly possess the greatest value viewed from the standpoints of egg production and table use?

2. Should poultry judges be instructed and required to award prizes in the utilitarian classes on the basis of practical utility, laying comparatively little stress on fancy points in comb, plumage, etc.?

3. Should buyers be urged to pay for eggs by the ounce or pound, and thus encourage farmers and others to keep those breeds and varieties which produce the largest weight of eggs per bird in the year?

4. Should the Eastern and Western Poultry Associations be united on a basis similar to that on which the Creamery and Dairy Associations are uniting?

It is not necessary for me to advance these points in detail; I simply submit them But as to prizes, I do not on this question intend any antagonism at all between the farmers and specialists or fancy breeders. I have no hesitation in saying that the specialists and fancy breeders have, to a very large extent, created a great deal of the interest now shown in poultry, and they have done more than any other class of men to improve the existing breeds. They have shown great skill in mating, selecting, care and

feeding, and we must give them the greatest credit for having originated new breeds by careful crossing, etc. And this work is still going on. Therefore I would not say a word, nor would I intimate anything in a question that would tend to dampen in any way the ardor of those who have done so much by their skill and enterprise in improving this particular department. I do not think there is any antagonism at all suggested by the questions, because any man who succeeds with fancy or pet stock can succeed equally as well in the utility classes. I think therefore the question is unobjectionable from that standpoint. For my own part, judging as I do, I would be disposed to think that perhaps larger prizes ought to be given for these special classes, that admittedly are of the greatest practical utility from the two stand-points of egg production or table use or both. I also think that in the present advanced stage of civilization, with competition so very keen, and living, as a result so very intense, we ought, unless something more important is injured thereby, to do what we can to assist people in making a living; and therefore I would be disposed to say that the largest prizes ought to go, as in the case of live stock, to the birds that are admitted to be the most valuable from the standpoints referred to above.

Then as to the judging. I was looking through the cards to-day, and I am glad to say that our judges appear to be guided very largely by practical utility. I see that the deductions for special points such as head, comb, etc., are comparatively small compared to the question of weight and form, which goes to make up practical utility, so we are moving in the right direction in that respect.

With regard to buying eggs by weight. When we buy potatoes or apples we always take weight into consideration, and for my part I cannot see why we should not do so in buying or selling eggs. There is a great difference in the sizes, and why should we continue to pay the same price for small as for large? The Englishmen will not have our small eggs, and why should we not drive them out of the market by paying for them at their real value?

As to amalgamation. If it is desirable at all it would be a great saving of expense, which would increase the prizes. That appears to be the only point on which it would be advisable, but if it would reduce the expenses and thereby enable you to increase your prize list, without of course interfering with any other important matter, it might be of benefit to do so.

Mr. Browne thanked Dr. Mills for his suggestions. There was, he said, great difficulty in getting the farmers to compete at our shows, and this operated against the utilitarian breeds.

Mr. G. McCormick said it was exceedingly hard to find two men who were agreed as to which were the utility breeds, and it would be a very difficult matter to instruct judges in the manner indicated in Dr. Mills question. He thought eggs should be sold by weight. It would not be advisable to amalgamate with the Eastern Association, as none but the fanciers would attend a show which was at any distance.

Mr. Scott, of St. Thomas, thought it would increase the general quality and size if eggs were sold by weight.

Mr. Wagner thought chickens also should be sold by weight.

## TREASURER'S REPORT.

Mr. G. McCormick read the Treasurer's report, and on motion of Mr. Trew, seconded by Mr. Bennett, it was accepted as read. (See page 8.)

## EXPRESS RATES.

A letter was read from the Manager of the Canadian Express Company, stating that the present rates for carrying birds were the best the Company could offer.

Mr. H. Wright asked that the Association hold their meeting in Owen Sound in 1899.

## ELECTION OF OFFICERS.

The election of officers then took place. The list is given on page 4.

## THE DOMINION GOVERNMENT AND THE POULTRY TRADE.

Dr. MALLORY, on behalf of the committee appointed to consider the question, submitted the following communication as embodying the views of the Association:

GUELPH, January 14th, 1897.

To the Honorable SIDNEY FISHER, M. P.

*Minister of Agriculture of the Dominion of Canada.*

SIR.—We the officers and members of the Ontario Poultry Association in their 23rd annual meeting assembled, beg leave to call your attention to the importance of the Poultry Industry of Canada, and to point out that during the years previous to the imposition of the duty on poultry and eggs entering the United States markets, this industry without the assistance of Government or any special efforts being made to foster or encourage it, had grown to very considerable proportions. That since the imposition of the present duty the industry has, on account of that duty and the distance from the British markets, very materially fallen off.

This Association is much pleased to learn that the Government of which you are so honored a member is about to introduce a system of cold storage and cold storage shipment facilities.

We beg leave to recommend that the Government take such steps as may be necessary to at once find out the average requirements of the British markets for eggs and poultry, the conditions governing those requirements, the kind and quality of the goods needed, the proper modes of preparing and packing the goods for shipment, the seasons of the year when the demands are the greatest, as well as any other information which may be obtained that would be of advantage to the poultry raisers of this country.

That having obtained this necessary information, the Government take the earliest opportunity to communicate the information to the farmers and poultry dealers by means of lectures at farmers' institutes and other farmers' and poultry breeders' associations, as well as by printed pamphlets properly circulated.

That every effort possible should be used by the Government to show the farmers of the country the advantages of the egg and poultry trade. By so doing this Association is fully pursuaded a very important and profitable branch of trade would be speedily built up, and the interests of the great farming community would be very materially advanced.

The report was adopted.

## INCREASING PRIZES FOR UTILITY BREEDS.

Mr. ESSEX moved, seconded by Mr. ANDERSON, that the Directors of this Association be requested to take into consideration the question of increasing the prizes to be awarded for utility breeds. Carried.

After an informal discussion as to what were really utility breeds the meeting adjourned.

## COLD STORAGE AND BRITISH MARKETS.

A meeting was held in the exhibition building, on Wednesday morning, January 13th, 1897, to hear the Hon. Sidney Fisher, Minister of Agriculture for the Dominion, express his views with regard to the cold storage arrangements proposed by the Dominion Government for each Province.

Hon. Mr. FISHER said that he was satisfied that if we could lay down poultry in good condition it was sure to result in good profits. A large quantity of fowl had been delivered in the English market last year, but it was not in as good shape as it should and could be if a proper system of cold storage was adopted. It would be well if poultry men generally, and this Association in particular, would bestir themselves in the matter. The English market was open if we would only comply with the necessary requirements. The English people were willingly to pay a good price for a good article, and he advised the development of the trade. He then asked for information as to the proper or best season for shipping, or if dead meats could be shipped all the year around. The Government, he said, was willingly to assist in the matter for the next two or three years, and would, he was in a position to state, provide as far as possible, all facilities. Refrigerator cars would be run as required to the central points where "receiving refrigerators" were placed, and several lines of steamships would be refitted with a good cold storage system, for service between Canada and England. He then asked for a full expression of opinion, but if it was thought best to discuss it among themselves, a report could be forwarded to him.

Mr. ALLEN BOGUE, who occupied the chair, stated that the McKinley Bill had all but killed the egg trade between Canada and the United States. When a cold storage system was established and a good market in England created, trade with the United States would, he thought, improve.

Dr. MALLORY agreed with Mr. Bogue that the McKinley Bill had injured the egg industry, which was yet in its infancy, and which had gone backward during the past two or three years. A great field awaited them in the English markets, and it should be taken advantage of. By sending only first-class poultry and in good condition they would not be long in developing a profitable trade. He stated that fowls during the last two weeks of their lives should be fattened, and after being killed made attractive in appearance.

Mr. M. T. BURN spoke at some length as to the kind of fowl wanted in England. He said we should start earlier to prepare for the English market—say in September; or, in other words, we should not all aim at getting our fowl there for the Christmas trade. As to the cold storage, he thought the rack system, with the rack above, was the best. There must be also good ventilation and plenty of ice.

Mr. BARBER said all poultry should be sent away with the feathers on and properly bled. If the farmers would take proper care of their stock they would not have the least trouble in getting ten cents per pound.

Mr. ANDERSON agreed with all Mr. Barber had said.

Mr. DILWORTH spoke as to the egg production question. The farmer should be instructed as to the best way of taking care of the eggs. The nest should be perfectly clean, and then the egg would be so. Large eggs are in great demand, and would be paid for accordingly. He also thought that fowls should be sent away with the feathers on.

Mr. BARBER said he referred to turkeys only.

Mr. SCOTT, of St. Thomas, would have the farmer impressed with the desirability of keeping better stock. They should also breed especially for the early market, and thus get the benefit of the high prices. The Plymouth Rocks and White Wyandottes are the best breeds for the farmer's purpose—good layers and well adapted for table use.

J. H. BAULCH, Port Hope, said if the English people want our fowl and will warrant a market and good prices, we can soon supply the demand.

Mr. A. Bogue said he thought a committee should be appointed, consisting of members from the different sections, to look thoroughly into the matter under discussion and forward to the Minister of Agriculture a resolution stating what is required.

The Minister of Agriculture stated that he would be glad to receive the report of the committee, and that the Government would, he was sure, endeavor to meet all their requirements.

Prof. Robertson, Dairy Commissioner, Ottawa, said the bulk of the poultry sent to England so far has been very poor in appearance, but he had no doubt a good system of cold storage would improve this. He would advise that birds be sent over in assorted sizes, eight to ten, ten to twelve, twelve to fourteen pounds, and so on, and not to mix the heavy with the light, but have them uniform in weight, as far as possible, in each crate. He thought that a net price of about ten cents per pound would be about what the farmer could expect, and he considered this very good. This would permit of a price to the middle classes of seven to eight pence per pound and he also considered this very good. He would advise that we aim to supply the English market from say November to the end of March, instead of only for the Christmas trade. In speaking about eggs, he said it was necessary to warm them after being taken from cold storage and before placing them in the warm air of an English warehouse. Different conditions of cold storage are required for different products, but the proper conditions required for poultry, eggs, butter and fruit would be provided by the Government.

Other gentlemen expressed themselves, but as the opinions were so varied and the subject so vast it was decided to refer the matter to a committee to thoroughly discuss, and report to the Hon. Mr. Fisher as early as possible.

It was moved by Mr. Dilworth, seconded by Dr. Mallory, that the committee above referred to be composed of the following:—Dr. Mallory, Mr. A. Bogue, Mr. Oldrieve, Mr. Barber, Mr. Dilworth and Mr. McNeil.—Carried.

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## ESSAYS AND ADDRESSES.

The first meeting of the Ontario Poultry Association was held in the City Hall, Guelph, on Wednesday, January 13th, 1897, at 2 p.m.

The President, Mr. T. Gowdy, took the chair, and, in calling the meeting to order, said he was sorry to have to report that the Vice-President, Mr. A. Bogue, was unable to be present, owing to illness.

This was the inaugural meeting of this kind, the time being set apart wholly for the purpose mentioned, and it proved a decided success, being well attended by the principal poultry fanciers and prominent men interested in the poultry industry. Among those present were Dr. Mills, of the Ontario Agricultural College, Guelph; Mr. A. G. Gilbert, Experimental Farm, Ottawa; Mr. W. McNeil, London; Dr. Bell, Toronto; L. J. Pequegnat, New Hamburg; J. H. Saunders, London; C. F. Wagner, Toronto; F. C. Hare, Whitby; J. Dilworth, Toronto; Jas. Anderson, Guelph; D. C. Trew, Lindsay; Rev. Thos. Geoghegan, Hamilton; Richard Oke, London; R. H. Essex, Toronto; W. Barber, Toronto; W. J. Bell, Angus; Dr. Mallory, Colborne, and M. T. Burn, Tilsonburg.

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## POULTRY CULTURE AS AN INDUSTRY.

By Rev. Thos. Geoghegan, Hamilton.

There are few questions upon which there is not considerable difference of opinion, and the question of poultry culture as a paying investment is no exception to the rule. The fancier who loves his feathered friends feasts his eyes upon their glorious plumage, and braces himself up and feels better as he notices the magnificent strut of the gentleman hen in the midst of his female friends, and will tell you that poultry pays well. He gets his money's worth, and more, out of the flock through his eyes every day. The faddist who catches the fever when he sees his neighbor's flock, or meets an acquaintance returning from the exhibition with a number of red tickets and a considerable amount of prize money, rushes in and purchases thoroughbred chickens at fancy prices, and gives neither himself nor the chicks any rest night or day for the next few weeks until he cools off, forgets to feed them, and leaves them in a draughty house a prey to dirt and vermin, and because they do not shell out eggs during the cold winter months, when prices are highest, and hatch out prize-winners for the fall shows, gives out as a certainty that there is no money in poultry, the thing is a dead loss, and that it is too small a thing, anyway, for a big-headed man to dabble in. In this, as in other things, what the man sows he reaps. In spite, however, of this discouraging experience, and of the fact that the country is in the throes of a mining boom, and that large sums of money are being invested in speculation upon gold development, and that many of our people expect to become millionaires suddenly, the small, old-fashioned and every-day enterprise of poultry raising as a means of livelihood, or as a department of farming which will increase the general profits and add to the sum total, is worthy of some consideration. The wonderful strides made of late years in the development of labor-saving machines has driven many active tradesmen to look for new lines of industry by which to earn a livelihood, has reduced the number of working hours and made the performance of heavy tasks light in comparison with the manner in which they were done in the days of our forefathers. The opening up of vast fertile plains for the growth of wheat and other cereals has reduced the price of grain, while pasture lands of great extent in the western part of the continent have reduced the price of meat, so that farmers in Ontario to-day find themselves much cramped in their incomes, and must, if they are to hold their ground and have a decent living, take up new branches of industry and adapt themselves to the condition of the times in which we live. There is an adage which says that "A man may as well stand idle as work idle," and if we propose new fields of labor for farmers and others, we must show that there is a demand for their productions, and profit in their labor.

The culture of poultry is no new thing. In excavations made in recent years in the Valley of the Nile, amongst other things unearthed, which had been covered for generations, were eggs apparently as fresh as the day on which they were laid. It is believed that the Egyptians attained to the very highest point of ancient civilization, and in their sculptures scribes may be seen in the market-place noting down the articles sold, and on the farm taking an account of all the products, to the number of eggs laid by each hen. If the people who built the Pyramids, and had such wonderful knowledge of architecture and the fine arts, thought it not unworthy of them to study the preservation of eggs, which doubtless was a great article of food amongst them, and kept such strict account of each hen that they could tell with accuracy her profit each year, it is surely worth our while in this young country to test this branch of industry and ascertain if there be any profit in it. After the Franco-Prussian war, the world was surprised with the rapidity with which the French nation paid off its war indemnity. The amount was not raised by the great sums of either the aristocracy or landed gentry, but by the large number of small sums made up by the great body of people. The small farmers, the cottagers and artisans, came to the rescue, and much of the money coming from comparatively poor people was the result of the poultry culture of that country. France as a nation

has (and does) recognized that the poultry trade is a source of wealth to its people, and protects and encourages it, because it brings in a large revenue and betters the financial condition of a great body of its citizens. Not only do the French meet the demands for home consumption in eggs and poultry, but they supply the English market with over $15,000,000 worth of this class of food annually. If France with her small area when compared with Canada can realize $200,000,000 annually with her poultry interests, what might not we in Canada do in the vast territory which we possess. There are few who realize the possibilities before this country in this branch of industry. If we would but take it up in earnest we would hear less than we do of hard times, of mortgages on farms being foreclosed, and tracts of land exhausted through the continued drain of years of grain growing. It is an unfortunate thing that so many people look upon poultry culture as too small a business to hope for any large results from, and yet it is one of the largest agricultural interests in the United States. The value as a product exceeds that of cotton, hay, or dairy products. In the State of Missouri alone the poultry product is about $15,000,000 annually, and in spite of the fact that in the United States $500,000,000 worth is raised annually for home consumption the supply is not equal to the demand, and over $2,000,000 worth of eggs were imported into the States last year. While the poultry products representing cash value is more than either cotton, hay, or dairy produce, it is the only agricultural product which the Americans do not export, and in which the supply is vastly insufficient to the demand. However we may have increased in exports in other departments of our trade with Great Britain and other countries, it is worthy of notice that we have decreased considerably in our egg export. In 1891 we exported $1,160,359 worth, while in 1895 we only exported $807,991, or a decrease of $352,404. Great Britain imported $18,931,645 worth of eggs, of this sum only $524,577, or a little over half a million, went from Canada. The decrease of import to the United States has been very marked since 1891. In that year it was $1,074,247, while in 1895 it was $275,828, or a decrease of $798,419. Why this decrease? We have good climate, we have cheap food, and under present conditions we ought to be able to obtain labor at a low rate; and here are fields open to us, with a prospect of good profits, and we are making little or no effort to occupy them and benefit ourselves by the returns. We should, under present conditions, be able to compete with the world, and it is our own fault if we don't do it.

From the report made by the Canadian High Commissioner in London, England, contained in the *Journal of Trade and Commerce*, 1894 and 1895, page 316, we find it reported under the heading of "Eggs," "This trade more than holds its own, and its importance from a Canadian standpoint will be realized when it is stated that the value of imports is nearly £4,000,000 sterling a year—the imports from Canada show a small but gratifying increase, and the price obtained appears to be higher than in former years. There seems to be no reason why, with proper care and attention, the import from Canada should not be larger than it is, and I refer specially to the reports of agents upon the subject. The following are extracts from correspondence that has reached me: (1) "Canadian eggs are fast coming into favor, both fresh and pickled, and if care is taken in the packing and selection, the trade can be developed to a considerable extent." (2) "On the whole the shipment of eggs has been satisfactory, and the consumption is rapidly increasing." (3) "We have again handled thousands of cases during the past winter, and where our friends have carefully graded and packed their goods, sending only choice and uniform size, quality and condition, the results have been satisfactory. Unfortunately shippers are so slow to learn the requirements of the British markets. It does not pay to ship inferior or second-class goods." In the same report, page 338, Mr. John Dyke, Canadian Government Commercial Agent at Liverpool, reports as follows: "There has been an increase in import of eggs from 11,045,786 great hundreds (1200) to 11,876,698 great hundreds. Canada's contribution toward this total amounted to 254,604 great hundreds, compared with 207,374 in 1893. As indicating to some extent the destination of eggs from the Dominion it may be of interest to note that one firm in Liverpool had consigned to them no less than 96,000 great hundreds, the majority came in cases of 1,200 each, and the packing is usually oat hulls, which has proved very

efficient; others came in smaller boxes packed in paper fillers. Prices have been low in this as in every other commodity, from $1.50 to $2.25 for fresh eggs, and $1 to $1.60 for limed or pickled. Continental pickled eggs have sold at higher prices than Canadian, and it is stated by the trade that this is in consequence of farmers and collectors in Canada holding for an advance in price, so that in many instances, when they were put on the market, they were stale. All over the continent, and especially in Russia, there appears to be a feeling of combination among the farmers, collectors and shippers with a view to capturing the British trade, and the co-operation that has existed among them has earned for the continental commodity a better character, therefore a better price. At the commencement of last season a very bad mishap unfortunately occurred. Some three car loads of eggs which were in transit in Canada, two on one line of railway, and one on another, got terribly damaged—it is said that they were literally telescoped; nevertheless they were sent forward, and on arrival here two-thirds had to be thrown away, the remainder were distributed over the country but were found to be tainted owing to the broken mass with which they had travelled, and by this means a widely spread prejudice against Canadian eggs was created, and their good character has not been wholly recovered during the whole season. It is stated by all connected with the trade that if properly conducted, and with a better spirit existing between producers, collectors, shippers, and forwarding companies, there is nothing to prevent Canadians holding the market against any foreign commodity, as the size, and when shipped fresh, the quality leaves nothing to be desired, though I would again remind those interested that the greater the number of brown eggs the more saleable is the case." Mr. Dyke also says in the same report under the head of "Poultry," "I am sorry to say that this branch of our trade has not expanded in any great degree. In November, 1874, and again in 1878, I issued a circular letter giving instructions as to how turkeys should be prepared for the market. Acting in accordance with them one shipper in Ontario entered at once into the business and has carried it on successfully ever since. This season's annual shipment, which is the sixteenth, arrived in perfect condition, and as the character of his turkeys has become well known in this district, his birds are much sought after. I believe he could have sold three times the quantity of this year's consignment. A small number of ducks and geese were brought over this season, and they surpassed anything of the kind on the market here. Some other shipments of Canadian turkeys were made to Liverpool, and where the condition was good fair prices were realized, but a few arrived in poor condition and had to be sacrificed. The total value of poultry imported into the United Kingdom from all quarters during the year amounted to $2,404,450. Mr. John W. Down, Canadian Commercial Agent at Bristol, on page 350 of the same report, under "Poultry and Eggs," says as follows: "Poultry appears only to be shipped once a year, viz., at Christmas, and our markets are often glutted with poultry sent from other countries to be sold on commission, and thus often finds a slow and bad market, whereas, I venture to think if the poultry were shipped weekly, and with judgment and care, a pretty fair market would be found all through the fall, winter, and spring months. If any dealers in Montreal, Toronto, or Quebec, are inclined to test the trade, I shall be pleased to make enquiries for them of the leading wholesale poulterers in this city and put them in communication with reliable men, willing to lend their services to establish a poultry trade between Canada and this port. The trade in Canadian eggs in Bristol is very small, and I have not heard of any direct shipments to this city, as all Canadian eggs that have been handled on this market have been bought through Liverpool importers. I have had considerable difficulty in obtaining reliable information, but find that the mode of packing of Canadian eggs is open to much improvement. I am told that both large and small eggs are packed together instead of being properly graded. There appears to have been no complaint as to the quality of the eggs. Surely this business is worth more attention, as France and Germany do a very large export trade at this port." Mr. Thomas Grahame, Canadian Government Agent at Glasgow, on page 358 of the same report, says: "The trade in eggs has been carried on in the same extensive manner as of late years, and on the whole has proved satisfactory. From all I can learn, however, I would desire to impress upon the farmers and local dealers the strong advisability of sending their eggs forward as quickly as possible as they come to hand,

and upon farmers particularly the desirability of their using the small eggs for home consumption. The Clyde bill of entry shows equal to 35,000 cases of Canadian eggs landed in Glasgow, representing 105,000 long hundreds."

It is very evident from the above quotations that Canada can increase her export of both eggs and poultry. The profit to be made upon it depends very much upon the way in which the business is managed—good stock, well cared for, will produce returns that will pay well for work done and capital invested. Energy, perseverence, and common sense brought to bear upon this industry will make it as profitable, or more profitable, than any department of agriculture or live stock upon which the farmer has to depend for his livelihood. An egg shell full of fact is worth more than a baloon full of theory, and here is a fact which may encourage our young boys and girls, as well as more of our farmers and artisans, to spend their spare time and invest some money in the poultry trade. Mr. George Tuckett, the present Mayor of Hamilton, who has been for years a most successful business man, stock-breeder, and lover of poultry, had, before he was fourteen years of age a flock of chickens, about 100 in number, from which he cleared a profit of $100 in twelve months. He kept his accounts carefully and correctly, and gives it as his opinion to-day that there are large profits to be made from poultry culture, as well as much profitable recreation and great enjoyment. Shakespeare tells us to look out for the man who has no music in his soul as a dangerous customer. The man who has no pets, if he be not dangerous, is at least to be pitied. The interest taken in the poultry-house and the pigeon-loft has laid the foundation of many a fortune, and of many a character, has saved numbers of boys and young men from those habits of idleness which are so dangerous to morals, and stimulated those of regularity, which lies at the base of success in every walk of life.

## HOW TO GET FERTILE EGGS AND HOW TO HATCH THEM.

By C. F. Wagner, Toronto, Canada.

Before attempting to hatch eggs we must first consider whether they are likely or not to be fertile. The fertility of eggs must obviously depend much upon the number of hens allowed to each male bird, which will vary according to the breed and other circumstances As a rule when fowls are confined to winter quarters they are not so vigorous. In heavy breeds not more than four or five hens should be allowed to each male, while in the lighter varieties eight or ten females may be put with one male bird. If fowls have not been properly fed we cannot expect to get fertile eggs. To procure well fertilized eggs we must feed on plenty of vegetable food such as cabbage, turnips, lettuce, dry cut clover steamed, potatoes, carrots, etc.; these can be boiled or the former may be given raw. Hens must have plenty of exercise when they are confined in close quarters.

To make them work it is a good plan to throw the grain into a litter of straw, hay, or leaves ; I find the latter to answer the best. Make fowls hunt for their living and they are sure not to be too fat. Another good way to make them take exercise is to hang a cabbage up about ten inches out of their reach, they will jump to get it ; by so doing they flap their wings, in fact all of their muscles get into motion. Parboiled meat and green ground bones if given three or four times a week are good egg producers and also strengthen the fertility. It is on good authority, I say, that milk if given fowls to drink instead of water will increase the egg production ten per cent. Fowls should always have plenty of grit before them such as mica crystal, broken oyster shells, etc. I have also seen finely broken earthenware used which took the place of gravel, etc., the hens find when running at large. Fat hens seldom lay fertile eggs. A hen that lays irregularly, that is, if she skips two or three days at a time, is almost sure to lay unfertile eggs.

Having considered the way to get fertile eggs we must now select those most suitable for hatching. Double yolked and irregular shaped eggs, eggs with thin shells and those with transparent spots in them should never be used for incubation. Some people believe that the shape of the egg affects the sex, *i.e.*, that the long eggs produce cockerels and the short bunty ones produce pullets, but this is an erroneous idea. The shape of the egg does not affect the bird so far as the sex is concerned, though sometimes an irregular shaped egg will produce a crippled chick.

The best eggs as they are collected should be kept in a cool place with a temperature of about 40° Fah. until ready to set under a hen. The eggs should be stood with the large end down, thus keeping the air bulb as small as possible. All being ready we must now prepare a nest. I have tried hay, straw, paper, sand, clay and green sods, the latter I found to produce the best results. The nest should be made out of a box or barrel with a hole in the side of it to admit the hen, the top should always be kept covered. Put a piece of carpet or an old bag in front of the hole to keep her in darkness which is advisable. Place some earth in the bottom of the barrel and pound down solid, and hollow out in the centre so that the eggs will roll in, then place a green sod in the hollow with the grass side up. Put some dummy eggs in for a day or so until you find biddy to be true to her nest, after which the dummies may be removed and the eggs placed on the grass. Thirteen is considered a sitting, they may not be too many for a good sized hen in summer, but it is too many in early spring when the weather is cold and unsettled.

Next thing is to select a hen. Sometimes we have no choice but have to accept a wild restless one. If she has feathers on her feet cut them off. If I had any choice I should select a Plymouth Rock or a Wyandotte ; either of these make excellent mothers.

Last spring breeders generally complained in my neighborhood of having bad sitters. I purchased six common hens at one dollar each and set them on valuable eggs ; the result was that five out of the six left the eggs before they were due, one of them within a few days of the eggs hatching. This nest full of eggs made me feel like (I won't say swearing) but it reminds one of the boy's rhyme :

Here lie birdies for whom I mourn,
Birdies who died before they were born,
Oh, what an awful thing is death,
When it comes before you get your breath.

I might have saved this batch of eggs by putting them into water heated to about 100 degrees, but as that lot were hatching in February it was impossible to get another hen. A year ago I had the same thing happen, but it was my own fault ; I had forgotten to shut the hen in after feeding her, and when I came to look at night I found her off the nest and the eggs stone cold. I quickly put the eggs into hot water for about five or ten minutes, and then put them back in the nest and the hen on again—the result was that three chicks came out a few days afterwards.

Every sitting hen should be well dusted with insect powder before being placed on the eggs, and then dusted again about the seventeenth day. Sitting hens should be carefully lifted off if they do not come off themselves each morning. Some people think a hen that does not want to come off the nest is the best kind of a sitter, and will even encourage their maternal solicitude by feeding them on the nest. This practice is not only cruel, sometimes laming a bird for life, but actually injurious, the periodical cooling of the eggs while the hen is off acting an important part in invigorating the embryo chick. Sitting hens should be allowed to dust themselves in a dust bath, if they will, and should be fed on whole corn and wheat alternately, and given plenty of clean water and grit each day. They should be left off for about five minutes in cold weather and ten or fifteen minutes in mild weather.

The heat of hens when sitting varies from 102 to 105 degrees. The underside of the eggs will be about four degrees cooler than the side next to the hen. The outside row of eggs are very often rolled into the centre by the hen, and vice versa—these change places three or four times every day.

About the third day a membrane begins to envelope the entire organism, which is to supply the blood of the chick with oxygen, which it obtains through the shell from the external air. This can only be seen by a very powerful light. I once experimented with a few eggs by greasing them all over, to see what the effect would be. I found they did not even start to hatch, the pores of the eggs being closed up the germ could not get air from outside. It is, therefore, essential that the eggs should be kept clean and free from dirt while hatching. The eggs, after hatching five or six days, should be tested, when the fertile ones will be seen to have the germ floating on top with a webbing of blood vessels stretching out from it—the germ at this stage looks like a spider in form. No matter how an egg is turned the germ will rise to the top. The manner in which this is effected is beautiful. Besides the ordinary white of the egg there are two longitudinal cords, or strings, of much denser and even slightly fibrous albumen, formed, which are easily distinguished if an egg be broken into a saucer. These cords are attached in a spiral form to the under side of the yolk, to which they, therefore, serve as ballast or weights, and always keep the germ uppermost, where it can best receive the heat from the sitting hen.

All sterile and broken eggs, if any, should be removed from the nest. When an egg has been broken and the nest has been smeared, the nest should be cleaned out and the eggs washed in water heated to about 100°.

To test eggs a good plan is to make a light tight box with a small hole in the top for the lamp fumes to escape by. Cut an oval shaped hole in front an inch or two larger than an egg and then tack a piece of an old felt hat over the hole and cut an oval hole in the felt a little smaller than an egg in size, then place a lamp inside of the box, by placing the egg against the hole just opposite the flame the germ can be seen distinctly if the egg is fertile.

When setting hens, a good plan is to set two or three or more at one time, and on the fifth or sixth day when all the infertile eggs have been removed the fertile eggs which are left can be put under one or more hens and the other hens could be set over again without any harm being done to them.

Eggs should be tested on the twelfth day again and the rotten or dead germed eggs removed. When the hatch is due leave the hen alone and keep her dark. All holes should be filled to prevent any chicks from running through or getting away from the hen, for chicks will run to the light.

Eggs are known to hatch in nineteen days, the reason of this is because they were put under the sitting hen immediately after they were laid. It is advisable to set eggs as near one age as possible because chicks do better when all are hatched the same day.

The chick breaks the shell by giving two or three smart taps every now and then. This is not done with the point of the beak as thought by many, but it is done with a sharp pointed scale, provided for that purpose by the Creator on the top of its beak. This scale falls off about two days after. When the hatch is concluded leave the chicks under the hen for twenty-four hours before they get their first meal.

The yolk of the egg provides the chick with nourishment during the first day or day and a half of its existence. The chick's first meal should consist of oatmeal or very fine cracked wheat given perfectly dry, never give them sloppy food. Keep plenty of fine grit before them, such as mica crystal. Give plenty of clean water in a shallow dish. Milk is said to be too strong for them the first week. Feed four times a day for the first month and after that reduce to three meals a day until nearly matured, when they will do with two rations per day. Give plenty of green food every day. Lettuce is very good and is eaten ravenously. After the first week give stale bread soaked in milk well squeezed out for their morning meal. A little meat two or three times a week will help the growth wonderfully. Always feed grain at night, and see that every chick has had all it can eat.

When chicks get to be one week old catch each one of them and search the down on the head for lice with a pair of jeweller's tweezers or something of the sort. As

many as a dozen have been found on one chick's head ; these things stand on end with their heads down and suck the chick's blood. They are hard to discover and take off if one has not got the proper instrument. When these insects are there any length of time the chicks run about with their wings drooping, and have a distressful chirp. After removing the lice take a little soft butter and rub each bird's head well, they will look unsightly for a day or two, but that is nothing compared to the annoyance the lice are to the chicks. The old hen will sometimes beat and reject her little ones when this operation is performed in daylight, as they look so strange to her ; therefore it is expedient to do it at night when the chicks are at rest ; by the next morning the down will have dried a bit and all will be well.

The hen and her chicks being ready to be put out doors we must make a coop of the following dimensions : Make a coop two feet square, eighteen inches high at back, and two feet high in front. The roof should be made adjustable and project about four inches in front and rear to shed water ; being loose it can easily be removed to clean the coop out and also to whitewash with lime inside when necessary. The front should be lathed with 1 x 2 strips two and a half inches apart, the centre one being left loose so it can be removed to let the old hen out occasionally. The chicks run out between the laths at any time, excepting when the sliding board front is put in place. This slide is put down at night in front of the laths, by raising and pushing back the roof. The slide is held in position by two strips which are nailed on in front of same to form grooves on each side of the coop for slide to work up and down in. After the slide is put in the roof is placed in its position, making all perfectly storm-proof. The slide in front has a small ventilation hole at top about 4 x 6 inches, which is covered with one-quarter wire meshing to keep out rats, etc.

The whole of the outside of this coup is covered with well saturated No. 2 tarred felt, which makes it wind and water proof. The felt will last a season easily. In front of this coop is placed a fence about six feet long, eighteen inches high and width of coop. This fence is made up of one-quarter wire meshing nailed on to frames made of $\frac{1}{2}$ x 2 inch laths. The top is also wired over on a frame. These frames can be removed at any time and will last for years. All being placed in position, lay a board six inches wide on the ground close up to the wire fence, one at each side and end ; these are covered with four inches of earth well packed down, making all secure. In case the chicks, when scratching, should undermine the fence they cannot escape, nor can vermin get in without a good deal of trouble. The whole thing is portable and can be shifted from one grass plot to another when desirable. I have seen cats sit and watch through the wire those little downy balls rnnning about, it being so small in the mesh that not even a mouse could enter.

Having considered the natural process of incubation, I will now give some experience in hatching chickens by artificial means It is not all gold that glitters, neither is it all incubators that hatch.

About three or four years ago I purchased an incubator from a manufacturer not 100 miles from here. This machine was guaranteed to hatch ninety per cent. ; I agreed to accept it if it would hatch, seventy-five per cent. of the fertile eggs. I sent it to an experienced man to have it tested, the result was that it did not hatch ten per cent. The hot water tank burst several times and caused a great deal of trouble. Last spring I invented a hot air incubator. This machine was heated by a lamp at the back ; the heat entered in one side of the heater, and the consequence was I roasted all the eggs nearest the lamp while those farthest away from it were chilled. I think one chick came out and the rest were dead in the shell That was not at all satisfactory to me, so I made some alterations to it and I found that it hatched better. It puzzled me why the machine should not hatch as well as a hen, if it would hatch chickens at all. So I made more improvements until it hatched seventy-five per cent. of the fertile eggs. Now I am satisfied that chickens can be hatched by artificial means just as well as with the old hen. The chicks being hatched I had to invent a brooder to rear them in. A thought struck me that I would use the old hot water boiler of

that ten per cent. hatcher I paid $47 for. I thought it would make a heater if I cut a hole in the bottom and placed a lamp underneath it, then form a board fence around it and cover one end for the chicks to run under. I kept the birds in it for four weeks and apparently they did very well until one day I thought I would let them have a run on the cellar floor which was sandy loam. I no more than had done this when they fell over and kicked, they instantly lost all power in their legs; so I learned a lesson that brooders with heated floors are no good, heat under the feet is unnatural and when thus applied causes leg weakness. This being unsatisfactory I invented another brooder which works admirably. The heat is all above the chicks, top heat is natural. I find the chicks thrive well in this machine. It is so constructed that the heat can be regulated to a lower degree as the chicks grow older.

To hatch chickens either by natural or artificial means one must use some judgment. Hens will not hatch a large percentage of chickens in early spring if they are not fed and properly cared for. Neither will an incubator if the lamp is not filled and trimmed regularly.

The advantages of hatching and rearing poultry by artificial means are numerous. An incubator enables the poultry breeder to hatch out chicks at any season of the year when hens are disinclined to do so. For market purposes chicks hatched in January, February, March and April bring the highest prices. Early chicks are also early layers, and therefore the most profitable. The winning chicks at fall shows are usually hatched in early spring when sitting hens are scarce. Chicks hatched in incubators are never infested with vermin, as are those which are hatched under a hen. Lice are the cause of many great losses in raising poultry.

Chickens reared in brooders don't run any risk of being trampled to death by the old hen, nor are they likely to be troubled with scaly legs, which sometimes is imparted to the chicks by the brooding hen.

Mr. BARBER could not see the advantage of setting the eggs away large end down.

Dr. MALLORY did not see what difference the position could make, especially as Mr. Wagner had stated in his paper that the germ always came to the top. It was, he said, almost impossible to get sod in the winter for nests, and he would like to know what great advantage it possessed.

Mr. WAGNER replied that the sod being damp kept the underside of the egg cool and he believed this was as it should be.

Mr. F. C. HARE thought, as the germ always floated at the top of the egg, that if the large end were placed downwards the germ would be more liable to stick to the sides of the shell. As to the nests, he had tried the sod and found it very unsatisfactory. He used sand and dirt himself, and as it could be obtained at any time of the year, and was easier to make a good nest with, he thought it preferable. He thought Mr. Wagner's coop would be improved by having the top and sides lift off, making cleaning an easy matter. He favored hot air for the brooder.

Dr. MALLORY again spoke, and said he thought we should not try to improve on nature and fix the position. The more closely we followed the habits of the hen the more successful we would be. Nature has provided that the egg shall be oblong, and that it shall not stand on its end. The most successful broods were those reared by the hen herself in the summer when she is allowed to take her own course, and we should endeavor to follow her as closely as possible.

Mr. WAGNER followed with a long description of experiments made in connection with the matter, and said his ideas were the result of these experiments.

## MY THIRTY-FIVE YEARS' EXPERIENCE IN POULTRY RAISING.

By Mr. James Anderson, Springfield Farm.

Before reading my essay proper, I would like to say a few words in regard to the working of the Association. We have to-day in Guelph the best poultry show ever held in the Dominion, and I question if better birds can be obtained on the continent of America than can be got here. It is now about a quarter of a century since the Association received the first Government grant Something close on $20,000 had been spent in trying to improve the poultry interests of Ontario. Has it done the good that was expected of it? Has it benefited the class it was intended to benefit, viz, the farmers? It may have benefited the few, but not the many; as, how many farmers do we see attending these exhibitions? All our exhibitions are liable to fall into ruts and grooves from which it is hard to extricate them, and what is worse, into the hands of a few professional showmen, who carry off the bulk of the prizes and leave the amateur completely in the shade. I am delighted to see Mr. McNeil carry off a few thousand dollars from Uncle Sam as he has been doing in recent years, but I do not like to see him sweep everything from his Canadian brethren. I have no doubt he deserves it, but are the class of fowl he breeds really for the best interests of the country at large, and that is what the Government grant was intended for. To give you a case in point: It is now twenty-eight years since our first Central Exhibition was established in the Royal City. I had the honor of being its first president, and have been a director ever since, and have watched the working of it very closely. In nearly every department the prizes now are taken by what are termed professional showmen. They buy, beg and borrow what they cannot grow themselves, and make a round of the different shows, and of course the local man or non-professional cannot compete with them. One man, for instance, in the fruit line from the Niagara district carried off sixty five prizes last year, and I am credibly informed never grew a pound of the fruit. How are we to avoid all this? I would suggest to encourage the farming community to raise first-class poultry for either eggs or table use, and appropriate part of the Government grant to a class for farmers only. Give, say, a prize for the best turkeys, geese, ducks and chickens raised by a farmer. I would not go into the fancy breeds of fowls, but a few of the best breeds for eggs and good table birds. I have always taken a great interest in the Ontario Poultry Association, was a member the first year it was held in Guelph, twenty-five years ago, and even got the length of being a director one year. I would like to see it do the greatest good to the greatest number, which was evidently the intention of the Government when the grant was given. We want to educate the farmers now to raise first-class fowls, and how to erect, cheap, warm, suitable buildings for winter egg production. Mr. James Laidlaw, jr., informs me that at a very small expense they fitted up a place for 150 hens some two years ago. They are now getting some $30 a month for eggs, and cannot supply the demand. Now if all the farmers in the country would go and do likewise, what a revenue it would yield them, as the demand is unlimited, and by having the cold storage inaugurated, which I believe is the intention of the Dominion Goverement, the advantages to the country would be very great, and would add thousands of dollars annually to the farmers in enhanced prices for their eggs and poultry. So much has been said and written by experts in poultry journals and in agricultural papers that it seems superfluous on my part to add more, but the few brief remarks I will make will be entirely from a farmer's standpoint.

### Hens.

Some thirty-five years ago, in 1861, I first commenced breeding thoroughbred poultry. I had shipped some pigs to a poultry fancier in Baltimore, and he advised me to try his thoroughbreds, which I did, and have never regretted doing so, as they have well repaid me. I gave him $10 a pair for two pairs, light and dark Brahmas The cocks from which they were bred cost, so he informed me, $50 each, and with a pedigree as long as

my arm. Since then I have bred six different varieties. Black Spanish was the next pure breed I invested in. I found them very good layers of fine large white eggs, but inclined to be tender, their large combs being so apt to get frozen. I then tried the brown and white Leghorns, which for egg production cannot be beaten. Then I tried the Games, but found them too pugnacious, although for a table bird they cannot be excelled, as a well-cooked Game fowl is as toothsome a bird as the English Pheasant, many of which I have shot and eaten. Speaking of Game fowls, I have been crossing lately the Indian Game with the Light Brahma hen, and a finer table fowl could not be produced, fine plump broad breast and grand size; in fact a cross of the Indian Game with any of the Asiatic breeds is excellent. After trying some six of the leading breeds, I have come to the conclusion that for a farmer's use the Plymouth Rock, the Wyandotte and the Light Brahma will fill the bill for a general purpose fowl. They are all good winter layers, very hardy and make most excellent mothers; in fact I prefer the Light Brahma to any other, they are so quiet and easily managed, and I set all my duck and often goose eggs with them. By keeping fowls in a moderately warm place, feeding them well with a variety of food, and keeping them clean of vermin you will have no difficulty in having a good supply of winter eggs. I find that saturating the roosts well with coal oil, and keeping a dust bath well filled with road dust, in which is incorporated half a pound of sulphur, with a little carbolic acid, a sure preventative of lice, and a good disinfectant. I have found wheat even at 80 cents a bushel the cheapest and best grain to make "Biddy" shell out the eggs in winter, with plenty of green food and table scraps or other meat, ground bones, etc.

### Turkeys.

My next venture was with thoroughbred turkeys. I had been breeding good turkeys for years, but never had the Mammoth Bronze until some sixteen years ago, when I purchased the 1st prize young gobbler at the Ontario Poultry Association show at Brantford. He weighed twenty-eight pounds at eight months old, and I paid $10 for him. My neighbors all laughed at me when I told them the price, but next year I had the pleasure of laughing at them when I sold all his progeny, some forty, for $5 and $6 a pair when they were only getting $2 a pair. Turkeys are great foragers and consume millions of insects annually which are injurious to the farmer. I have had my farm seeded down to grass for the last ten years, and as the grasshoppers have been a perfect plague lately, and as in summer they form the principal part of their food, without the turkeys every bit of grass would have been eaten up. Although very tender when young they are the hardiest of fowls when grown. I have no trouble in raising them. Keep them dry and give them good nutritious food, and keep clean. I have a neighbor, a Miss Hewitt, who raises some 100 annually. She feeds them principally on shorts and boiled potatoes mixed with finely chopped dandelion leaves. Of course for the first fortnight she gives them hard boiled egg and a little curd. I find the wild camomile a grand tonic to mix with their food. The sooner young turkeys get out in fine days to forage for insects the better they will thrive, as they are very fond of ants, etc. I bought a pair of wild turkeys some fifteen years ago from Messrs. Smith of Fairfield Plains, and found them very hardy birds, and the meat delicious and of fine flavour. I often crossed them and found them very hardy, and they improved the plumage very much, but I had great difficulty in keeping them at home, and they often got shot by pot hunters when straying away in the woods. I had one old hen who started off in the spring, and I never saw her often until she would have fourteen or fifteen large turkeys and they would fly like a covey of ruffled grouse. They always came home when the snow fell and food became scarce. I have never tried the White, but their advocates say they are finer in quality than the Bronze. The number of turkeys shipped to England lately is immense, some thirty tons going from Smith's Falls alone, and now when our government is giving us such facilities for cold storage which will be provided, I believe from the time they are shipped until landed at their destination, the trade may become enormous. I showed a young two year old bird last year at our Christmas fat stock show weighing when dressed thirty one lbs., and for which I got ten cents per lb. which pays very well.

### Geese.

Some twenty years ago I bought the first prize Toulouse geese at the first Ontario Poulty Association show held in Guelph, and have bred them ever since, and they have been a great source of both pleasure and profit. The old goose which only recently got killed, in the twenty years must have laid over 800 eggs, as the first year she laid forty-five and whenever she wanted to sit I would shut her up for a few days and she would commence to lay again. I often got her to lay forty and fifty eggs in a season. I set her eggs with common geese or under my largest light Brahma hens, which would cover six nicely. I gave Mr. Laidlaw the breed, and one of his geese laid sixty eggs this last season. They were originally from the stock of Mr. Todd, Vermilion, Ohio. The Toulouse and Embden cross makes a very large bird; I have seen them weigh twenty lbs., and my neighbour Mr. Buchanan has taken the first prize at our Fat Stock Show in Guelph for sixteen years in succession with a cross between the Toulouse and China goose, weighing seventeen and eighteen lbs. dressed. So you see the first cross of geese gives often a finer heavier bird than the pure variety. I find geese very profitable and easily kept. In fattening I use a mixture of chopped peas or corn with boiled potatoes and a little cattle spice mixed with it. The feathers are also a very valuable figure in suming up the total of the goose's good qualities, and for a good Christmas dinner what can beat it.

### Ducks.

Twenty-five years ago I bought from Mr. Sturdy, then of Guelph, now of British Columbia, a pair of Rouen ducks from stock imported from England—and good ones they were. I do not think our veteran breeder, Mr. James Main, could beat them. I have tried the three breeds, the Aylsbury, Pekin and Rouen for years, and have fallen back to my first love, the beautiful Rouen. For what can be handsomer than a full plumaged Rouen drake with his iridescent head, claret coloured vest and white necktie, which gives him if not a clerical a very dignified appearance. I have had the Rouen weigh nine lbs. dressed, and I never could get the other breeds that weight. The Pekin is a ve y early layer and a very large bird to look at, but the bulk of it is feathers, and it is coarser in the grain than either the Aylesbury or Rouen. What a beautiful sight a large flock of pure white Aylesbury ducks are sailing down the river. The river Speed runs through my farm, and I have every facility for raising any amount of water fowl, as it is swarming with craw fish, frogs and other food. I think there never was such a chance for poultry raisers to make money as at present, as the demand is greater than the supply for a first-class article. Messrs. Strachan and White of this city shipped tons of fat poultry this fall to Halifax, for which they find good prices. I have got as high as $1.50 a pair for my prize ducks dressed, $3 a pair for turkeys, $2.50 for geese and $1.50 for chickens. What can pay better than that, especially in these dull times? When grain is such a low price there is nothing pays better than raising first-class poultry.

Mr. Barber said he did not think the fancier should be depreciated, as it was from them that nearly all the best fowls were obtained.

Mr. Anderson said he did not intend to speak against the fancier, but he wanted the farmer to have an equal chance. He thought the Government grant should be divided so that some of it should get to the farmer.

Dr. Mallory congratulated Mr. Anderson on his paper. It was, he said, the practical experience of a man extending over a great many years, and it was such papers as these that were needed. The Ontario Poultry Association is not especially a farmers' association; it is a fancier's association and it is entitled to all the consideration that the Government of the country will give it, on the same grounds that stock associations get their grants to bring to the highest perfection possible those animals which they take special pride in. These are sent throughout the country for breeding purposes, and the farmer thereby gets the profit.

## ADVICE TO BEGINNERS.

By L. G. Pequegnat, New Hamburg.

Having been requested by our worthy Secretary to write a paper on poultry, I have accepted the invitation, and will briefly give a few points of my experience as a poultry fancier and breeder. I may say that from my boyhood I have been a great lover of pets of every kind, and especially pets of the feathered tribe. In order that a young man should meet with success he should choose exactly what is most congenial to him, and is best adapted for him, and with a strong will and determination, success eight out of ten times will be the result. How is it that a great number of men to day have made failures in life? It was owing to fickle mindedness, jumping from one thing to another, and at last they became a burden to themselves as well as to others. Now this applies to poultry fanciers. In the first place if you have not been gifted by nature to be a lover of fowls or pets do not venture in the pursuit thinking that you will find a gold mine, as disappointment will surely be the result. You can force and teach your fingers to play a tune, but that will not make a musician of you. Now, to admirers and beginners the most important requirement is to make up your mind, and then select a breed and study the standard carefully. A breeder should be familiar with the defects which disqualify a bird. An amateur will have his hands full with one variety, and in keeping it right will be more successful than by keeping half dozen varieties. Take advice from those that have paid dearly for their experience, and do not get discouraged if you are not successful at exhibitions the first couple of years. Do not change your breed because they have not come up to your expectations; have staying power. A visit to winter shows is the best educator, fowls at that time are at their best. It teaches you that your stock is up to the standard, or that it needs improvement. Buy the best and from reliable breeders. Use your influence in your section to form Poultry Associations, an important factor to educate the farmers in keeping pure-bred stock. How pleasing it is to the eye when out in the country to notice a fine flock of well bred fowls. The hen deserves the choicest consideration and every opportunity for development, for besides being an object of usefulness it is pleasant to gaze on a fine lot of poultry. After a hard day's work on the farm, in the store or office, to the professional business man, mechanic and farmer, what pleasure it affords to attend to a fine flock, and when we consider the profits which are realized when properly conducted these should be sufficient to induce every man to make it a special study. The feeding of poultry is most important and should not be neglected. They must be supplied with green food and constantly have fresh water. Their quarters should be clean, well ventilated, not over crowded, and if convenient let them out doors in winter once a day and the egg basket will always be filled. The grateful hen will also fill your heart with joy and pleasure.

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## A FEW GENERAL REMARKS TO FARMERS.

By Jos. Dilworth, Toronto.

It is an acknowledged fact that if a farmer understands "poultry raising" it will pay him better than anything else on the farm, and in the next place the work of attending to them is decidedly the pleasantest, cleanest and the most interesting; but I regret to say that the majority of our farmers will choose much harder work to gain their livelihood. A very important item to be considered is how to make the most money with the least possible outlay. The first thing I would do if I were a farmer would be as follows: With the assistance of my wife I would devote all my spare time to poultry and duck raising. It is not only important to make a good beginning but it is of vast importance

to begin at the right time. In the first place I would be careful to select the best position on the farm suitable for poultry buildings, taking good care to have them shielded from the north and north-east winds. I would also locate them just where I could extend them from time to time as my flock increased. As to the kind of building or buildings, I would say that I would endeavor to make them comfortable, but not necessarily at great expense. I would be perfectly sure that they would be erected on very dry ground —never, on any account, build a poultry house on swampy or damp soil. I believe more trouble arises from that cause than any other, which I will endeavor to show you before I finish this subject.

I would begin in the springtime, although I would have, as a rule, to pay more money for my stock, yet it would certainly be much more satisfactory and a source of much greater pleasure. Of course a beginner must expect to have some drawbacks and disappointments, for want of experience. As the old saying goes, "don't count your chickens before they are hatched" I would buy my first breeding stock from a true fancier, and would expect to pay a liberal price and make a good clean start. I think ten dollars for six such birds as would produce satisfactory results would be a fair price. From these birds I would expect to raise between the first of April and last of June at least one hundred chicks, which would give me a chance to make my selection for winter. I would sell all my culls and surplus stock not later than October 1st. Never under any circumstances keep old or young birds a day longer than they are a source of revenue. It is certainly a very unwise thing to feed chicks or ducklings after they are full grown and ready for the market; as a rule it is better to let them go at market price and invest the money in winter feed for those that you are going to carry over. Never keep any birds more than three years unless they are specially valuable as breeders. Avoid overcrowding. I have been intimately acquainted with the farming community for the last thirty years, and I might say that I don't remember ever seeing a farmer's poultry house in winter that was not far too small for the number of fowls he had in it. Where they had fifty they should only have had about twenty. It's not much use arguing the point here; suffice it to say that you are just losing that much difference in feed. If you would always count on giving one yard square of floor space to each fowl you would not be far astray.

Cleanliness is the next very important part to insure success, which costs but little. Have everything arranged conveniently, so that you can clean them out every day as you do for every other animal on the farm. Keep the floor of the poultry house covered several inches deep with chaff or dry leaves. To prevent vermin attend to the above and use lime whitewash with carbolic acid added, twice a year; change the nests often, especially in summer time. A good thing to keep on hand, and which is very cheap, is the following: Take one pound of pure carbolic acid, which you can buy at from thirty to forty cents. per pound, then buy a bag of land plaster and mix the two thoroughly together, first melting the carbolic by placing the bottle in hot water, not forgetting to remove the cork; when melted add about a wineglassful of water, and it will keep it in liquid form, then put about three parts of it into the land plaster and mix it thoroughly —if you have a seive, so much the better; you now have the so-called carbolate of lime, so much recommended by druggists. It is not only a good vermin preventative, but a good deodorizer and disinfectant. It can be used liberally and often, as the cost is merely nominal, keep a dredging box in a convenient place for constant use—one thing is certain, it is a perfect specific against gapes in chickens.

A word or two about tonics. Tonics and stimulating medicines are occasionally wanted, but are frequently overdone. A great deal has been said about the old remedy called Douglas' Mixture. For my part, I could never see much in it; but anyway, if it doesn't do much good it won't do much harm. If your fowls require an iron tonic, I would use the stronger liquor of perchloride of iron—use about half a teaspoonful to every gallon of water. If you wish to make it into what is commonly called tincture of iron, mix one part of it with three parts of alcohol and water and it is ready for use—mix a teaspoonful of this with every gallon of water; never continue giving iron mixtures

longer than a month at a time, then discontinue for a month, and repeat alternately as occasion requires. It may be given with advantage in the moulting season. Another valuable tonic might be kept on hand for occasional use:

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| Ground gentian root | half ounce |
| Powdered nux vomica | half " |
| Baking soda | one " |
| Common salt | one " |
| Glauber salts | one " |
| Cayenne pepper | half " |
| Powdered aniseed | half " |
| Corn meal or shorts | three pounds |

Mix thoroughly by passing it through a seive. A tablespoonful is sufficient for six hens. This makes a very good tonic and condiment at very little cost.

A few words about feeding may not be out of place. For my part I would only feed twice a day. Never give sloppy food or unsound grain; always put the soft feed in a suitable box or feed trough that the fowl cannot get their feet in—in any case never think of throwing soft feed on the ground, and never leave feed enough for fifty if you only have twenty. Sloppy feeding and impure, stale, dirty water is often the cause of inflammation of the bowels, cholera, diarrhœa, dysentery and death.

A question is often asked, are fowl healthy? I would say yes, if they are properly fed and suitable buildings provided. In this connection I would like to impress the following on my hearers, and if you should forget everything else, don't let your fowl stand incessantly on heavy, damp, clay soil, or where the earth has become impregnated with dirt; if you do you must expect your fowl to be troubled with the diseases I have already named, also rheumatism, roup, canker, scaly legs, etc.

The following is an excellent cure for scaly legs or scurf on the shanks: One ounce sulphur, thirty drops oil of vitrol, two ounces vaseline or petrolatum. Mix together with an old knife and apply to the parts affected twice a day for ten days. The above is a perfect cure.

A great number of cures have been advertised for the cure of roup, catarrh and canker. The following is well worthy of a trial, and if the disease is not too far advanced I think I can safely say that it will cure nine cases out of ten: Lotion No. 1.—Bluestone, $\frac{1}{4}$ oz.; water, one pint; mix together; wash the mouth and nostrils every morning; use the following ointment every night: One drachm of powdered iodoform, one drachm of boracic acid, thirty drops of carbolic acid, half an ounce glycerine, two ounces vaseline. In addition to the above diseases I might say I have used it for years for old sores, cold in the head and catarrh in the nose, and any eruption or pimples on the skin. Apply it with the finger to the nose and mouth, not too freely but gently, always the last thing at night, and lotion No. 1 every morning.

The following is a well tried remedy for rheumatism and lameness: Mix together one ounce pure mustard, one ounce oil of tar, one ounce sweet oil, eight ounces spirits of turpentine; shake before using and rub on twice a day.

A good remedy for diarrhœa, dysentery and cholera will be found in the ordinary compound rhubarb pills; in very bad cases however, I give opium pills half a grain each. Give the rhubarb pill in the morning and the opium pill at night. It is usually checked in a couple of days with the above treatment. It is always better to separate the affected birds from the rest of the flock. I would give a rhubarb pill to those not affected, which answers as a preventative to the disease, and don't forget to use freely the carbolate of lime every day. When they have recovered I would recommend Easton's syrup. It contains phosphate of iron, quinine and strychnine, and is an excellent thing for building up weak and debilitated constitutions, two to five drops for a dose twice a day. A question often asked by the farmers is "What are the best kind of fowls to keep?" My answer would naturally be those you admire most; but if I were going to keep them purely for business purposes as a matter of dollars and cents, and were so situated that I considered

eggs would pay me best, I would keep the small breeds, as I consider for the amount of food they eat they will produce the largest number of eggs—Leghorns, white or brown; Andalusians, Black Minorcas or Hamburgs. If you want a general purpose fowl I would keep Wyandottes or Plymouth Rocks.

I often wonder how it is that farmers do not give more attention to the raising of ducks for market. I think that one of the general ideas is that they must have a pond or creek, or they would be a failure. I can assure them they are greatly mistaken about that as I find our city buyers will buy land fed ducks every time in preference to water raised, the former are much finer in flesh, consequently command a readier sale. These is one thing, however; if a farmer intends to raise ducks as well as chickens they must not be fed together under any circumstances. As a rule you will find ducks pay you best when sold at the age of about eight weeks, sell them when they reach the weight of three or four pounds. If your farm is in close proximity to a railway station, or a city, or large town, you may reasonably expect to make a poultry or duck farm pay you much better than any other industry on your farm. What I have said is from my own observation and practical experience.

There was a long discussion as to the best treatment of roup and canker.

Dr. MALLORY asked what was the difference, if any, between the two diseases.

Mr. GILBERT said there was a difference in the two diseases, and also he thought in the cause. Roup may be brought on by a cold. Canker he had had from a dirty place or from earth contaminated by the droppings. The first named, unattended, will cause death. It is a germ disease. Canker, by removing the cause, can be easily cured. Through the carelessness of his man in not renewing the sand on the floor of his hen house during his absence from home, his fowls were badly affected by canker. By promptly attending to them, and thoroughly cleaning the hen house, the trouble soon disappeared. He believed carelessness was the cause of a great deal of canker. In some cases he had used alum for healing purposes.

Dr. MALLORY said that evidently both diseases were germ diseases, and anything that would destroy the germ would cure, other things being equal. A strong solution of nitrate of silver would do this, if applied with care.

Mr. C. F. HARE said one of the great causes of both diseases was poor ventilation—the houses were too hot in the day time and too cold at night. For this reason he thought the use of straw instead of sand for the floor should be advocated. The sand was too cold on the feet, and if this was guarded against the fowls would not be so liable to take cold.

Prof. MILLS, of the Agricultural College, said he would be very glad to have a bird sent to the College at Guelph for examination.

Dr. MALLORY asked if the Professor meant that anyone having a case of suspected roup was at liberty to send the head, at least, to the College for examination.

Dr. MILLS: Yes.

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## DISEASES OF TURKEYS.

By W. J. BELL, ANGUS, ONT.

It is not my intention in this paper to deal with every disease which affect turkeys, but only those which are contagious or which will often carry off a whole flock. Adult turkeys, if given their liberty in daytime, are generally free from any disease, and if they escape those mentioned in this paper the loss from other causes will be slight. The best remedy in every case is the "ounce of prevention," because in my experience the "pound of cure" won't work. When it comes to pouring drugs down the throat of a turkey to

cure a disease, the chances are 10 to 1 that Mr. Disease gets the turkey. For this reason I have very few remedies to offer, and in giving the "ounce of prevention" cure, hope I will not be accused of wandering from my subject. Nearly all the ailments which turkeys are heirs to attack them when under six weeks old, and the one that is probably entitled to first place for death dealing power is the disease (?) of

LICE.

You will first notice the birds with their feathers turning towards their head, then in a short time they draw their head almost into their body, refuse to eat and go chirping about in a very pitiful manner. The first thing most people do when they notice the lice (in many cases too late for any remedy) is to grease the head well, others again feed large quantities of sulphur. I must say that I have never seen a turkey with its head all covered with grease afterwards turn out a healthy thriving bird, and I have seen a number of otherwise healthy young poults die by too much sulphur being placed in their food. My remedy is not to wait until you see the lice, but dust the nest and hen well with Persian insect powder when placing the eggs under her to hatch, and again give the hen a thorough dusting two days before you expect the young birds. If you have a knoll near by where you confine the hen, place some road-dust on it for them to dust in. I think these precautions will save you any further trouble, but if you notice their feathers on back becoming rough shake a little insect powder on them, also on hen when covering them at night.

Another troublesome disease is

DIARRHŒA,

the symptoms of which need no description and is caused mainly by carelessness in feeding. My mother birds are confined in a coop with lath front and no bottom. I am very careful to remember and move this coop the breadth of itself every day as compelling them to sit on the one spot for two or three nights will cause this as well as other complaints—loss of appetite, etc. Again, I feed tham five times per day, at regular intervals, shorts mixed with milk. This is fed entirely out of my hands. I sit until they are all satisfied and then there is none left to sour upon the ground, another cause I think of this trouble. I also try to mix just enough for each feeding, but if any should be left I feed it to the other fowl. I believe the green leaves of the dandelion are good to keep the bowels in order, and I frequently cut them up fine and mix with the shorts. Do not set water before them in the morning and make that do them until night. Give fresh water every time you feed them.

Those that give their mother hen and clutch free liberty, usually have very little trouble with diarrhœa, but then their loss in other ways—hawks, foxes, skunks, sudden rainstorms, etc.,—are numerous. When a hen is kept in a coop for four or five weeks then give her liberty, they stay around that spot for another week or ten days and then they are old enough to stand rainstorms, hide from hawks and look ont for themselves generally. For diarrhœa in old birds I put tincture of iron in their drink, but it is seldom they are afflicted if they have free range.

ROUP OR SWELLED HEAD

is usually troublesome in late fall and early winter. The first symptom is froth on the eye, breath becomes very offensive and face under the eye commences to swell, which continues as the disease advances. My flock had it badly in the fall of '89, and it was November, '90 before I got entirely rid of it. I haven't the least doubt but it was caused by crowding forty birds into a warm house 10 x 15 feet to roost at night. I made a larger building and did not try to get it warm and have never had a case since. I think if those who are bothered with it will watch their turkeys going to roost they will find them going into what is probably an overcrowded house, and it would be far better to have them roost on the barn or fence. I tried numerous remedies, but only succeeded in

one case, and came to the conclusion that doctoring was no use. I had one valuable hen (first prize winner at Toronto) which I worked with until her head burst. After that (I would grab the axe as soon as I noticed them taking it.

"We began the practice three years ago of putting to death all sick fowls that were really bad off. We have learned more and more that way, until now we do not waste much time or labor on sick poultry. We dread bad colds, catarrh and roup above all other ailments and diseases combined, and make short work of any fowls that are seriously affected. We firmly believe this plan pays best. Our fowls are remarkably free from these troubles this season. They never before were in as good health and vigor. We are much encouraged. We shall never again breed a fowl that has been cured of a severe case of catarrh or roup—the bird won't be alive to breed."

I now come to a disease of which I have had no experience,

LIVER DISEASE,

—but from information received this fall I believe, if it should gain a foothold—will become the worst enemy that turkey breeders will have to contend against. On November 20, 1893, I received a letter from a leading cattle, sheep and swine breeder in north-western Ontario as follows:

DEAR SIR,—I write to you to ask you a few questions about turkeys. 1st. Our turkeys are dying of liver complaint and have been for two years. 2nd. Do you think it is over-feed? 3rd. Do you think it is hereditary in the ancestors? Yours respectfully, ————.

I answered that I knew nothing about it, but thought it might be hereditary. This gentleman then purchased a pair from me, but in a short time wrote for another gobbler as the one he had got had died of the same disease. I could not supply him this time, and I had almost forgotten all about it when I received a letter from Pawtucke, Rhode Island, on November 26th last asking for information on the same malady. My correspondent writes:

"I have been endeavoring for four years to raise turkeys, and my experience is this, I have no trouble in hatching and the chicks seem healthy until they get to be five or six weeks old when they commence to die one at a time. We have made a *post mortem* examination of every case, and have invariably found the same ailment, viz., a diseased liver. This has been our experience each year. I wrote an article to the *Country Gentleman* setting forth the facts as herein stated, and asked for others' experiences, and for a remedy, but got no reply, and so far I have failed to solve the mystery. Yours truly, ————."

This brought the former inquiry to my mind, and I wrote asking if he had found the cause or a remedy, he answered as follows:

"Yours to hand. We have had no luck with turkeys since I wrote you. I will give you remedies tried with no success. 1st. Killed off all turkeys and bought new, which took the disease in a few days, and those that rallied did well and seemed to be healthy, but their offspring all died from five to nine weeks old. 2nd. Built new house, whitewashed, with carbolic acid added, killed old turkeys and bought three new, but only saved one; bought three more common and saved two. Young birds died as usual. 3rd. Tried Carter's pills, saltpetre, and every other remedy we heard of. We soaked some peas in coal oil and saved some we bought in, but could not save young birds. We burnt all the birds that died After the old birds have been here for six weeks and live, thrive and do well and lay plenty. This last spring we thoroughly washed turkey house, dug up all the ground, spread lime and plowed all around house and had fair luck this year only losing half the young birds. Have broken the land with plow, dug inside and spread lime this fall and purchased new birds, common ones, and are going to try again. The only preventative we have found of any use up to present is to thoroughly whitewash, dig up the ground and burn all the dead birds. Lesson we have learned—do not import when you can buy reliable birds nearer home. We got the disease from ————, Ohio. Signed yours truly, ————."

My reason for not giving names is on account of this gentleman breeding other fowl, and it might hurt his business. This is the worst disease which I have become acquainted with, for here are two gentlemen, one trying for four and the other for five years, and still have not found the cause. If there is any one here who has had any experience with "liver complaint" in their turkeys I would like to hear from them.

## HINTS ON MANAGEMENT OF POULTRY.

By Mr. A. G. Gilbert, Manager Poultry Department, Experimental Farm, Ottawa.

He expressed pleasure in meeting the leading poultry breeders, fanciers and many of the farmers of the country. They had met to compare experiences, exchange ideas and help development of the poultry interests in every way possible. Under the first head, one of his most pleasant experiences during the past year was the greater interest taken in poultry rearing by the farmers as a means of making money, and a revenue producer poultry would certainly be found if intelligently managed. Another agreeable experience to him was to note the great improvement in size and appearance of Barred and White Plymouth Rocks at Kingston show held a few days previous, and in Rocks and Wyandottes, and indeed in several other breeds, at the great show now going on in the Drill Hall under the auspices of the Ontario Poultry Association. At Kingston there was one White Plymouth Rock cock bird which weighed no less than eleven and three-quarter pounds. There was a Barred cockerel which weighed ten and a half pounds, and other birds old and young which showed great development. Hens and pullets of both breeds named were in most cases much over than under standard weight. At the show now going on, Wyandotte development was shown to be equally gratifying. In the way of development in the past year he could mention the greater attention paid to artificial incubation as a means of producing the early chicks wherewith to secure the gilt-edged price. Artificial incubation and rearing of chickens had come to stay. Improved incubators were being made and results were no longer doubtful. There were, of course, incubators more reliable than others. Men had thousands and tens of thousands of dollars invested in the artificial rearing of chickens as a means of making an income. If you went to any of these men and asked them if they ran their incubators for fun or for profit, what would their answer be? Why, the reply would be that the money was invested as a business enterprise, out of which a satisfactory margin of profit was made, or the business would be dropped and the money spent to better advantage. Those men used incubators and brooders as the publisher used his printing press, as a means of making a livelihood. These men were in reality specialists. The farmer had a great chance to make one hundred or double that number of hens pay well by utilizing a great deal of the waste of kitchen, barn and fields. With proper management a farmer ought to be able to make the number of fowls mentioned pay him from one dollar to one dollar and a half per head per annum profit. But such success could not be attained without a thorough knowledge of how to house, how to feed, the proper quantity to feed, the proper fowls of the right age. He would give the laying stock fairly comfortable quarters. They should be fed a soft mash three mornings of each week in quantity enough to *barely satisfy*, and never enough to *gorge*. Overfeeding was the cause of more loss than any other cause. The soft mash should be fed in quantities of one quart to every twenty-five hens. The other mornings of the week cut bone or some other form of meat waste should be fed in the ratio of one pound to every sixteen hens. Immediately after the morning feed, a handful or two of grain should be thrown in the litter on the floor so as to start the hens scratching for the grain, and they should be so kept busy until going to roost. Where the hens are so kept busy no noon ration is necessary. A liberal ration of grain should be given in the afternoon. It should be fed early enough to permit of the hens busily searching for it. The object is to send the layers to roost with their crops full. Vegetables should be constantly before the hens, as should be oyster shells, grit, clean water, etc. There can be no doubt that by following the above instructions farmers will get eggs from their hens in winter. Having got the eggs, effort should be made to market them to the best possible advantage. Eggs in winter commanded a higher price. There is also a demand for *strictly new laid* eggs in midsummer, and the Government by means of cold storage gave opportunity to ship poultry and eggs of superior quality to the British or best market offering. Farmers should not fail to take advantage of the opportunity about to be given them by means of cold storage. But they must first produce the superior

poultry, which was not only wanted for export but also for home consumption. The farmers could get the superior poultry in one season by making a choice of and breeding from one of the following breeds : Plymouth Rocks, Wyandottes or one of the Asiatic family. Chickens from any or all of these breeds ought to make flesh development of eight pounds per pair in four months. Such had been done by the speaker time and again, and what he had done others could do. He concluded by strongly advising the farmers present to give more attention to the poultry department of the farm, which with intelligent management would be found one of the best paying ones.

Mr. McNeil thought Mr. Gilbert fed too much soft food.

Mr. Gilbert read figures for the last two years, showing that under the rules given in his address his hens had done a great deal better than when he fed more hard and less soft food.

## THOROUGHBREDS *VERSUS* MONGRELS.

By Robert H. Essex, Toronto.

The breeding and exhibition of thoroughbred poultry is governed by the "American Standard of Perfection."

This standard provides each breed with an imaginative ideal in shape and color, and the object of every breeder is to reach that ideal.

Notwithstanding that this standard was compiled by experienced poultrymen, whose interest it was to guard against deterioration in thoroughbred stock, we hear it continually said, by persons who lay no particular claim to experience, that their mongrels are just as good as the stock of the professional poultryman. "Why should I keep thoroughbred stock?" they ask ; "yours may be prettier ; they may have a regularly serrated comb, and perhaps better colored legs, but my mongrels lay just as well as your fancy breeds."

Again—"What is the advantage in your exhibition stock? Come over to my farm and I'll show you a rooster that will weigh more than any of your fancy birds."

This talk is all clap-trap. These persons, likely, never weighed the rooster that looks so large in their opinion, and it is evident they know nothing of the rules governing the breeding of exhibition fowls.

It is for this reason that I will endeavor to give them one or two pointers.

The Standard of Perfection provides against any reduction in size of exhibition birds ; not only that—it is so very exacting in this respect that to keep the birds up to standard weight it is absolutely necessary for the breeder to make *size* the *first* consideration when mating the birds for breeding. It is nearly impossible for an undersized fowl of the utility breeds to win, be it never so fine in plumage and other fancy requirements, if in competition with birds of standard weight.

Nine and a half pounds for a cock, seven and a half pounds for a hen, is no small weight for a bird of any breed, but when we consider that this is the weight allotted to a general purpose fowl, a bird bred as much for its egg producing capabilities as for its table qualities, then it is evident that in weight the thoroughbred bird is ahead of anything that can be claimed for the mongrel. There are breeds that weigh pounds more than this, but they are not general purpose fowl.

In the matter of egg production the thoroughbred leads without a doubt.

In a competition held from February 1st, 1894, to January 31st, 1895, (just one year), pens of thoroughbreds and mongrels were competing for a prize which was carried off by a pen of Plymouth Rocks, which pen averaged 289 eggs per fowl. This is the breed I had in mind when speaking of the general purpose fowl. Can your mongrels beat that record? Is it not strange that in all such competitions thoroughbred fowls form a great majority of the competitors, and yet there are thousands of mongrels bred

to one thoroughbred. The upholders of mongrels have a thousand birds to choose from, while the breeders of thoroughbred stock have only one, and yet they enter not the competition.

In *Farm and Poultry*, a prominent poultry paper published in the United States, a record is given of three pullets of the White Wyandotte breed. They laid fifty eggs each in ninety days. A Golden Wyandotte pullet laid twenty-five days in succession. These are also general purpose fowls, not bred especially for egg production, but for table purposes as well.

An account of another competition appeared in the April, 1895, number of the same publication. In a trial for a year between six mongrels, two Minorcas and four Plymouth Rocks, the six thoroughbreds laid 61½ per cent. of the total number of eggs, while the six mongrels laid only 38½ per cent. This trial was made by a man who desired to ascertain for himself which fowl laid the most eggs, thoroughbred or scrub. You may be sure he kept no more mongrels.

Intending breeders must not be led astray by the records I have quoted, and expect to equal them at the first attempt. If you do it in a lifetime you will have made a success of the business.

The manner of feeding adopted by the owner of the Plymouth Rocks which averaged 289 eggs each will be of interest I have taken it from the *Reliable Poultry Journal*. The house faced south, and of course was well built. It had an earth floor, covered about four inches with road dust and sand. My experience proves this is the best floor, if good and high above the outside ground, although I prefer to add leaves and chaff to my pens.

The fowls in question had free access to oyster shells and grit. Twice a week they were supplied with granulated bone. Breakfast consisted of equal parts of bran, white middlings and chopped corn and oats, with some fine beef meal given warm. At noon they got wheat, for which they had to scratch. In the evening they received whole corn. That was their winter feed. From April to November their morning meal was mixed with cold water, and in the evening wheat took the place of corn.

The owner of these birds remarked that he had bred Plymouth Rocks for five years, and had no disease, which fact he attributes to cleanliness and proper care.

There are a few things to be borne in mind by those who desire to profit by their fowls. It is unnecessary to say that winter layers pay best. To obtain winter layers, if keep either breed of the American class, which is understood to be the general purpose fowl, you must hatch your chickens in April, or certainly not later than May. I am assuming the birds are not forced. My experience is that these breeds require seven months in which to mature. I have heard and read of those which lay at four and a half or five months, but they are not of the general utility breed, and if by any chance they should be, it would be all up with them in the show-room, for they would never attain the size. If you want large fowls hatch them early, but do not force them. If the cold weather comes on before they commence laying it will be eight or even nine months before they lay. Therefore remember to hatch in April, if possible.

As I am speaking of general purpose fowls, a few words on marketing will not be amiss.

The farmer who keeps his cockerels (or pullets either) until November before selling them is losing money. Suppose they were hatched in April. That means they have been fed seven months, and they are marketed when fowls are cheapest. I have bought live pullets and cockerels in November at Toronto market for twenty-five cents a pair. That's low. The average price is about thirty or forty cents a pair at that time. If those identical fowls had been sold in July they would have brought more money. A chicken three or four months old in June or July is worth twice as much as the same chicken will be in November after having consumed four months additional food. In the first case, too, the storekeeper will ask you for them, and in the latter you have to coax him to buy. Why throw away your time and feed?

If large and vigorous stock is required and you do not desire to spend money on a large stock of thoroughbreds, keep your largest females and purchase a thoroughbred

male bird of the same variety every two years; don't let it go beyond three years, and keep one variety only.

Now you will ask "What kind shall I keep?" To my mind the American class is the farmer's all round fowl, and it is of that class I have been speaking. It is the general purpose fowl. Small combs, profuse, but not heavy, feathering and hardy constitutions all suggest winter layers, and winter layers they are. I will give a short description of this class, and you may take your choice.

The American class consists of five breeds: The Plymouth Rock, the Wyandotte, the Java, the Dominique and the Jersey Blue. These have acquired the name of the utility breeds by reason of their combining the qualities of a table fowl and a layer. To preserve its adaptibility for market a scale of weights is allotted to each breed, and as the specimen is lighter or heavier than the scale, so is its exhibition value diminished or increased.

*The Plymouth Rock* breed is divided into four varieties, viz.: The Barred, the White, the Pea Comb Barred, and the Buff. The weights are as follows: Cock, 9½ lb.; cockerel, 8 lb; hen, 7½ lb.; pullet, 6½ lb. It must be remembered that these are the minimum weights, and that many male birds will tip the scale at twenty pounds the pair. The flesh of the Plymouth Rock is a desirable yellow, the only drawback being the dark pin feathers which disfigure the Barred variety when improperly plucked. In the Buff and the White Rocks this drawback is absent, for although the pin feathers may have been left in the bird, yet the color so nearly corresponds with the flesh color as to be scarcely noticeable. The color of the Barred Rock may be designated speckled, as that description is often used. If a feather be plucked it will be seen to be of a gray ground, with blue bars extending across at regular intervals.

*The Wyandottes* are divided into five varieties: The Golden, the Silver, the White, the Buff, and the Black. They average about one pound lighter than the Plymouth Rocks. They have similarly yellow flesh, and, in the Silver, Golden and Black varieties the dark pin feathers. The Wyandottes have rose combs, which is an advantage in winter. They are equal to the Plymouth Rocks as layers. The plumage of the Golden Wyandotte's neck is golden bay with a black stripe through the centre of each feather. In the male the back is golden bay, while the female's back feathers are edged with black, as are the saddle feathers The saddle of the male corresponds in color with the neck. The breast feathers of male and female are golden bay with black edging Tails glossy black.

In the Silver Wyandottes, a silvery white takes the place of that portion of the Golden Wyandotte's plumage, which has been described as golden bay; the black being similarly distributed.

*The Java* has three varieties: The White, the Black, and the Mottled. They are identical with the Plymouth Rock in size and have yellow flesh. While the Rocks and Wyandottes have yellow legs, the Java has black, willow and yellow in the respective varieties, with a dash of blue in the Mottled Java. The comb is single and small, as in the Rocks. They are good winter layers, and, as their size suggest, good market fowl. The plumage of the Mottled Java is a mixture of black and white.

*The American Dominique* is one of the ancestors of the Barred Plymouth Rock, as from this breed is derived the so-called speckled plumage which distinguishes the Rocks. The weight and comb of the Dominique corresponds with the Wyandottes. As layers they are also in the same class.

*The Jersey Blue* is not so well known nor so extensively bred as the other varieties. They are about the same weight as the Rocks. In color a light blue mixed with a darker shade. The dark blue or slaty legs suggest an inclination to white flesh, which in this country is not favorably looked upon.

Before concluding, I would remind the novice that overfeeding has killed more fowls than has starvation. "Little and often" is the motto to adopt in feeding poultry, and remember that they should work for every grain they get after the morning meal.

# COMMON DISEASES AMONGST POULTRY AND SIMPLE REMEDIES.

By Thomas A. Duff, Toronto.

It is not without considerable diffidence that I speak on this subject, so important to all breeders of poultry, whether their operations be on a large or on a small scale. So far as my experience in poultry matters extends, I must confess that I have rarely seen the subject properly or fairly treated. I do not make this observation because I feel myself at all equal to the subject. However it will be my aim in this article to endeavor to point out the causes of disease in poultry, the symptoms of the more common diseases and the appropriate remedies. I wish it to be distinctly understood that I am not an M.D. or a V.S., but I feel that I can, perhaps, to some extent, prescribe for poultry.

## General Causes.

Nearly all poultry diseases are caused by one or other of these four things: *Cold, damp quarters, want of cleanliness or bad feeding*—in other words by *neglect* somewhere. It is far easier to *prevent* than to cure The great obstacle to contend with when birds are ill is that since they are covered with feathers, there are few *symptoms* to observe, and as you cannot tell what is the matter with them, very often you are compelled to prescribe very much in the dark.

In most of the fatal diseases there is a poisonous fungus growth in the blood. Fowls never perspire, by which means many evils might be thrown off; on the contrary, any evils that they have must be thrown off by respiration, and the result is that the great majority of poultry diseases are found in the head, throat and lungs, and therefore it is in these parts that we must look for the symptoms of disease.

Very often diseases are inherited; that is to say, the parent stock were themselves unhealthy and passed their disease on to their progeny. If anyone should be so unfortunate as to have a flock suffering from inherited disease, I would strongly advise the butcher's block, and the obtaining of new stock.

To my mind, also, a certain class of *in*breeding is also injurious—such as the mating of a brother and sister.

There are, however, many cases in which exposure or other active cause has occasioned in the most healthy birds an acute disease, presenting plainly-marked symptoms, the treatment of which should be well and thoroughly understood. Such cases are most amenable to judicious treatment, and fowls of great value may thus be saved, which, without this knowledge, might otherwise be lost.

The best doctors are those who watch their patients while well, and *prevent* sickness, instead of waiting for symptoms and then trying to cure them. These find their best remedies in the regulation of the diet. It is, therefore, important to remember that fowls require good wholesome food, clean water and plenty of fresh air.

## Ventilation.

Lack of proper ventilation is one of the commonest causes of disease. A great number of breeders run away with the idea that suitable ventilation has been secured when a ventilator is put in with its bottom opening flush with the roof. This is a great mistake. It is the foul or cold air we must get out of our building, without carrying off too much of the hot air; but when the ventilator comes only just through the roof, the result is that we carry off the bulk of the warm or hot air which, during the winter months, it should be our aim to retain in the building. The foul air is always at the bottom of the building, where also the air is coldest. This foul air can best be carried off by extending the ventilators downwards to within eight or ten inches of the floor. This can be easily accomplished by making your air shaft of six-inch boards, and, instead of bringing it only

just through the roof, bringing it, as directed above, to within eight or ten inches of the floor. The result will be that you will have the coldest air, which is also the foulest, carried off, and that the warmer air will be retained.

For use in summer I have an opening cut in the ventilator shaft close to the ceiling, and when this is opened the warm air at the top of the building is carried away. The one ventilating shaft thus carries off the cold foul air in winter, and the over-heated air at the top of the building in summer.

We should utilize as much of the warm air as possible in winter, but care must be taken to see that it does not become foul. The ventilator, carefully watched and regulated will prevent this.

### Cleanliness.

Next, it is of the utmost consequence that the premises are kept thoroughly clean, and that the houses are disinfected *at least* once every two weeks with carbolic acid and water in the proportion of two tablespoonfuls of the acid to a gallon of water.

### Distemper.

To this disease all chickens are subject, and it may be contracted at any time, but more especially in the fall of the year. It is easily cured.

*Symptoms.*—A listless, quiet disposition. During the first day there is a slight puff or fullness in the face. On the second day a white froth will be observed in the corner of the eye. There is also a decided loss of appetite.

*Treatment.*—Isolate the fowl affected, and place it in warm comfortable quarters. Bathe the head and throat twice each day with a solution of vinegar and water in the proportion of one of vinegar to ten of water, and give a one-grain quinine pill every morning until the patient is cured. It is well also to put a little iron into the drinking water. Four days of this treatment will usually effect a cure.

### Roup.

This is the second stage of distemper, and, unless the affected fowl is a very valuable one, I would destroy that bird and give close attention to the remainder of the flock. Thoroughly disinfect the poultry house and add iron to the drinking water. A little sulphur in the soft food would also result in good.

*Symptoms.* Swelling of the head to such an extent that the eyes are often closed, and a discharge from the eyes and nose which is very offensive to the smell. These discharges result in a thickened yellow pus.

*Treatment.* Press the nostrils until they are free from matter. Bathe the head and throat with the solution of vinegar and water the same as for distemper. Give a teaspoonful of castor oil, and a one-grain quinine pill night and morning. Birds affected should be isolated, and kept warm and dry.

### Chicken-pox.

*Symptoms.* An eruption on the comb, face, and wattles; in color, yellowish white.

*Treatment.* Isolate all affected birds, and disinfect the poultry house. Remove the crown from each eruption. This will leave a bunch of tiny spiles or spikes, which will bleed profusely. Take a common caustic pencil and rub each scab. Next day apply a mixture of carbolic acid and vaseline. In about ten days all scabs will disappear. Give the fowl a one-grain quinine pill every day for four days. Feed soft food, into which put chopped onions. If the eyes are closed so that the fowl cannot eat, make small pellets of food, dip them into milk, and you will find no difficulty in slipping them down the fowl's throat. Chicken-pox is usually cured in about ten days if taken in time, but if neglected it will carry off the entire flock. It is a very contagious disease.

### Canker.

This is a terrible disease, and is usually caused by dirty houses and filthy quarters.

*Symptoms.* Diarrhœe sets in, and the throat becomes enflamed and hot. This is followed by a white blotchy matter forming on the tongue and throat, often stopping up the gullet.

*Treatment.* Isolate the fowls affected, and disinfect the poultry house. Clean out the throats of the birds diseased, scraping off all the white cheesy matter. This will often cause the throat to bleed. Then touch the parts effected with caustic. Give a teaspoonful of castor oil. The caustic should be applied every other day.

*Sure Cure.* "Use a knife in the neighborhood of the throat, freely dividing the head from the body." It is better to kill the afflicted individual and then look after the remainder of the flock.

### Bumble-foot.

*Symptoms.* A swelling on the bottom of the foot which extends to the uppermost side. It is usually caused by a fowl jumping off a high roost on to a hard floor.

*Treatment.* Lance the swelling and squeeze out all the pus or matter. Then poultice with linseed meal, renewing the poultice every morning.

### Diarrhoea.

This troublesome complaint is caused by any sudden change in the diet, or a decided change in the temperature, and hence it is rather common. It is also caused by the lack of fresh water for the fowls to drink Fresh water should be given all fowls in summer, at least three times a day and it should be protected from the sun. Diarrhœa is often caused by no water being provided for the fowls so that they drink from the barnyard pond.

*Symptoms.* The discharge resembles oil and pepper mixed, with green or yellow streaks through it. The fowl shows great exhaustion and moves about in a listless manner, as if all its muscles were gone.

*Treatment.* Take equal weights of cayenne pepper, rhubarb, and black antimony; mix thoroughly. Put a tablespoonful into a quart of shorts. Isolate the fowls affected, and feed them the shorts with this mixture twice a day. I have found this remedy to check the disease at once.

Another excellent receipe is as follows:

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|---|---|
| Sweet tincture rhubarb | 2 oz. |
| Paregoric | 4 oz. |
| Bicarb. soda | ½ oz. |
| Essence of pepperment | 1 dr. |
| Water | 2 oz. |

*Dose.* One tablespoonful in a quart of water.

For young chicks an excellent cure is scalded milk. I have also found common starch to be excellent.

### Cholera.

*Symptoms.* In true chicken cholera there is a sudden and violent accession of thirst, accompanied with diarrhœa; the droppings at first are of a greenish character, but by degrees they become thin and whitish, resembling "rice water." Great weakness results, and the fowls will often be found lying near the water fountain. The birds also present a peculiarly anxious look about their face. Chicken cholera is caused by excessive exposure to the sun—lack of shade, and heated water. The disease runs very rapidly death generally resulting within forty-eight hours.

*Treatment.* Isolate the fowls, and every three hours administer :

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|---|---|
| Rhubarb | 5 grains. |
| Cayenne pepper | 2 grains. |
| Laudanum | 10 drops. |

giving midway between the doses a teaspoonful of brandy diluted with rather less than its bulk of water, into which may be put three drops of iron.

Whenever a case of true cholera occurs in a yard, iron should be put into all the drinking water, the fountains *kept cool*, and plenty of shade provided. By these means, with the free use of green food, progress of the disease may almost always be effectually checked.

### Cramps.

These are caused by damp weather or damp quarters.

*Symptoms.* The fowl squats on its hocks ; its toes are drawn up. The ailment is usually found in young stock.

*Treatment.* Remove to perfectly dry and warm quarters.

### Crop-bound.

This trouble is caused by careless feeding, or an accumulation in the crop of dry grass which has been picked up by the fowl. Mr. Lewis Wright thus describes it :

*Symptoms.* "If the feeding be careless, the crop may become so distended with hard grain that when swelled afterwards by the moist secretions intended to assist digestion the outlet into the stomach is hopelessly closed by the pressure.

*Treatment.* "With patience, an operation is seldom necessary ; but some warm water should be poured down the patient's throat, after which the distended organ is to be gently and patiently kneaded with the hands for an hour or more if needful. However hard at first, it will generally yield and become soft after a time ; and when it is relaxed a dessertspoonful of castor oil should be given, and the bird left in an empty pen. Usually there will be no further difficulty, but the fowl so affected must be fed sparingly for several days, to allow the organ to contract, otherwise a permanent distension may result, which, indeed, is sometimes the case after the greatest care has been taken ; but beyond being unsightly this causes little injury to the bird.

"If such pailiative measures fail, an incision must be made near the top of the crop. Let the bird be laid on its back. Gently remove some of the feathers from the crop, and select a spot for your incision free from any large vessels, which, if cut through, will cause troublesome bleeding and weaken the bird. The incision, in most cases, should be an inch long. The handle or bowl of a very small teaspoon is convenient to remove the contents, and the best plan is to remove everything, and then to pass the finger (greased, and the nail pared smooth) into the crop, and to feel the outlet. It is quite possible that a bit of bone, or other material, may be the cause of the obstruction, and if this is left in the operation will be useless. Then have what is called a glover's needle ready, charged with horsehair, and put four or five stitches into the inner membrane, drawing it carefully and closely together, and put, at least, three stitches in the outer skin. Place the stitches in the outer skin in such a position that they may be between the inner stitches. Take special care not to sew up the two skins together, as this would be almost certainly fatal. Feed, subsequently, on sopped bread, not very moist, and do not allow the bird water for twenty-four hours, as it is apt to find its way through the wound, and delay, if not prevent, the healing. There is not the slightest necessity to remove the horsehair subsequently. The operation should not be delayed if the other measures do not succeed in forty-eight hours, as delays add to the danger ; and a sour, horrible stench from the bird's mouth is a plain indication in favor of operating at once."

### Egg-bound.

*Symptoms.* The most usual symptom is that the hen goes on the nest, comes off again without having laid and walks slowly about, often with the wings hanging down on the ground, and evidently in great distress.

*Treatment.* Oftentimes a full dose of castor oil will give relief in a few hours; if not, a small, flexible syringe should be passed up the oviduct till it meets the egg, care being taken not to fracture it, and an ounce of olive oil injected. It would be well to steam the vent before applying the oil.

### Scaly Legs.

*Symptoms.* Leg scale is a scaly substance which grows upon the leg. It is caused by filthy quarters. To my mind, it is also hereditary.

*Treatment.* Bathe the legs with coal oil and apply a mixture of sulphur and lard three times a week.

### Feather Eating.

Instances have always occurred of fowls contracting the unnatural vice of devouring each other's plumage.

*Treatment.* Give plenty of raw meat, plenty of vegetable matter, and soft food. I believe the immediate cause is *thirst.* Therefore, always see that the fowls have plenty of fresh water. Idleness is also a great cause, so see that the poultry are made to scratch for every particle of grain which they devour. This may be done by throwing their grain food into litter or chaff placed on the floor.

### Leg Weakness.

This trouble is of frequent occurrence in cockerels of large breeds, and is caused by their outgrowing their strength.

*Treatment.* Feed plenty of bone dust in soft feed, and see that the fowls are abundantly supplied with green food.

### Lice.

Lice, while not a disease, are a great pest, and I deem it well to touch upon the subject briefly. There is absolutely no excuse for a lice-infested poultry house. If, however, you are so unfortunate as to have lice in your poultry I will give the remedy which I would adopt.

I would remove all the fowl from the building and thoroughly clean out all the chaff from the floor and nest boxes. Remove this chaff to the outside and burn it. After this is done make a whitewash, to which I would add four teaspoonfuls of carbolic acid for every gallon of the wash Take a spray pump and force the wash into every crack and crevice of the structure, completely drenching the entire building. I would then pour coal oil over the roosts and into the nest boxes. After this is done I would take a sulphur candle (which can be procured at almost any drug store), place it on a tin dish and light it. Close every window and door and allow the fumes from the sulphur to leak out as best they may. After these fumes have been completely exhausted, take the fowls and dust them thoroughly with Persian insect powder or Dr. Hess's Instant Lice Killer. I have found this latter powder very excellent. In dusting the fowl take particular care to see that a liberal supply is put in the neighborhood of the vent. After all the birds have been thoroughly attended to, put them back into the house, having first put on the floors fresh chaff, and into the nests clean straw. After this spray the entire building once a week with a solution of carbolic acid and water in the proportion of two tablespoonfuls of the acid to each gallon of water; and my advice is to use boiling water, as the fumes from it are extremely pungent, and thus more lasting benefits will accrue.

This article is necessarily a practical one. I have attempted to deal only with those diseases that are of common occurrence, and I trust that what I have said will be found useful to the many who take an interest in poultry.

## A FEW HINTS ON MAKING OUR POULTRY MORE PROFITABLE.

By J. E. Meyer, Kossuth, Ont.

It is an undisputed fact that there is no department of the live stock of our farms that is so generally neglected or managed with so little knowledge of the requirements as the poultry. We meet farmer after farmer who is not making anything like the profit, if indeed he is reaping any profit at all, out of his poultry that he should make. One of the reasons for this state of things is that we will generally find that a farmer's flock of poultry is made up of birds of all ages from those miserable, worthless and most unprofitable youngsters that are hatched out in stolen nests late in the fall to the long since worthless old hen that no longer lays. No hen should be kept over two winters. I would strongly advise every farmer who finds himself in possession of such a flock as we have described, on say January 1st, to kill off all late chickens, also all hens that are not then perfectly through the moult, and keep only those that are moulted, are plump and heavy, and look red about the head. These, no matter how few they are in proportion to your flock, are the only ones you should keep through the winter. We must get eggs in winter if we are to obtain the greatest returns from our fowls, and only early-hatched, well-matured pullets and healthy yearling hens will furnish us with winter eggs in paying quantities. The advantages of having only selected birds of proper ages in a flock can be seen at a glance. To illustrate, take 100 hens, 60 of which are old and past laying, or too young to lay, and so are doing their best under very unfavorable circumstances and at great waste of food to grow to maturity, while the remaining 40 are all that can be desired to produce eggs at a profit. The food eaten by the 60 is a total loss, and besides they are crowding the 40 good ones so that they cannot produce as many eggs as they otherwise would on the same food. The loss is very great, and accounts very largely for the cry so often heard that "there is no money in poultry."

Just here, while speaking of crowding, let me say that one of the greatest mistakes made in keeping poultry is keeping them in two small quarters No manner of feeding will obtain for you the maximum return from a flock of crowded hens in winter. Allow from five to six square feet of floor space for each hen and besides, if possible, give them all the run on the barn-yard that the weather will permit.

To tell the age of your hens use a small punch to put a hole through one of the webs of one of the feet of each chick as you take it from the nest For instance in say 1896 we punched a hole through the outside web of the right foot of every chicken we hatched that year. This year we will put the hole through the inside web of the same foot etc. By keeping an account of the way you mark them each year you will always be able to tell the age of each bird, as these holes very seldom grow shut.

Always have a breeding pen into which place ten or twelve of your very best females and a male of some pure-bred variety. By breeding only from your very best layers you will in a very short time materially increase the laying qualities of your flock. There is no stock on the farm that can be so rapidly improved as the poultry. Hens have been bred to increase their egg production from 150 to 250 per year in a few years. It costs but little to obtain these results, and they can never be obtained by breeding from say fifty hens and five or six males each season, and besides this last method, the one almost universally adopted by farmers is a very wrong one as I shall endeavor to show. It is one of the commonest mistakes to keep a male bird to every ten or twelve females in the flock "for the purpose of making the hens lay." Experiments have been conducted which without exception go to prove that hens without males will lay fully as many eggs as with them, and in many cases the experimenters found that they laid from ten to fifteen per cent. more. Everybody who sells eggs knows that during summer with all the precautions they know they cannot always get perfectly fresh eggs. Some of them in spite of all they can do will be bad. Our egg dealers, and those who

use our eggs, are constantly finding bad eggs amongst those laid on our farms. The cause of this is keeping males in the flock. Let us look at the difference between a fertile and an infertile egg, or an egg laid by hens with a lot of males amongst them and one laid by a flock of hens without male birds. The first egg contains the germ of life to which if 90° or over of heat be applied life will start. Our mid-summer weather often reaches 90° in the shade but how often do you go one night and gather the eggs from a certain nest and the next night you go to the same nest and find a hen setting on five or six eggs. You know she was not on there the previous night and foolishly thinking the eggs are all right you place them amongst the others. The fact is that those five or six eggs being fertile and having been heated up to the required temperature life has started in them and when they become too cold for that life there is death and after death follows decay. This is the source of the bad eggs and also of those fence-corner hatched chickens.

Now let us look at the infertile eggs. There is no life in them and all a hen can do by setting on them is dry them up. A large portion of an egg is water and this water evaporates when subjected to heat or left exposed. Suppose a hen then should set on a nest of these eggs for months she could not convert them into bad eggs. There could be no decay. It would not be right to take a nest of infertile eggs that a hen had set on say three weeks and sell them for strictly fresh eggs. They would be stale eggs—dried up eggs. The substance inside the shell would be egg and harmless or good eggs, too, and while I might not care to eat it as egg, it might, if the hen was a clean hen and the egg had not been exposed to any bad odor, be used for baking purposes. I have eaten infertile eggs that have been in an incubator seven or eight days, and they are as good as fresh eggs for all ordinary purposes.

When we learn to keep no males in our flocks of hens we will be able to supply our customers whether at home or abroad, in England or the United States, with eggs that will give satisfaction and until we do this I cannot well see how we are going to build up the extensive and profitable egg trade with Great Britain that we are all looking forward to.

## POULTRY EXHIBITION.

### Held at the City of Guelph, January 11th to 15th, 1897.

List of the varieties on exhibition and the number of each.

| Varieties. | Number of specimens. | Varieties. | Number of specimens. | Varieties. | Number of specimens. |
|---|---|---|---|---|---|
| Brahmas | 29 | Javas | 29 | Geese | 48 |
| Cochins | 54 | Spanish | 23 | Ducks | 70 |
| Plymouth Rocks | 105 | Minorcas | 44 | Pheasants, Pigeons, Rabbits and Songsters | 257 |
| Games and Game Bants | 199 | Houdans | 20 | Dressed Fowl | 2 |
| Bantams | 107 | Creve Cœurs | 3 | | |
| Langshans | 47 | La Fleche | 6 | | 1,622 |
| Wyandottes | 139 | Polands | 56 | | |
| Leghorns | 178 | Red Caps | 4 | Incubators and Poultry Supplies | 5 |
| Andalusians | 18 | Sultans | 6 | | |
| Hamburgs | 59 | A. O. V. Fowls | 12 | | 1,627 |
| Dorkings | 51 | Cross Breeds | 9 | | |
| Dominiques | 11 | Turkeys | 36 | | |

Names of the places represented in the exhibition and the number of specimens from each.

| Place. | County. | Number. | Place. | County. | Number. |
|---|---|---|---|---|---|
| Amulree | Oxford | 4 | North Glanford | Wentworth | 12 |
| Angus | Simcoe | 12 | Nassagaweya | Halton | 7 |
| Brantford | Brant | 2 | Osaca | Durham | 13 |
| Brampton | Peel | 11 | Owen Sound | Grey | 5 |
| Brockville | Brockville | 9 | Petrolia | Lambton | 4 |
| Churchill | Simcoe | 6 | Port Hope | Durham | 70 |
| Cobourg | Northumberland | 6 | Palmerston | Wellington | 59 |
| Durham | Grey | 4 | Ponsonby | Wellington | 4 |
| Deer Park | York | 7 | Paris Station | Brant | 30 |
| Drumquin | Halton | 4 | Ridgetown | Kent | 17 |
| Guelph | Wellington | 167 | Strathroy | Middlesex | 24 |
| Galt | Waterloo | 26 | Shakespeare | Oxford | 15 |
| Georgetown | Halton | 16 | South End | Welland | 17 |
| Grimsby | Wentworth | 7 | Sheffield | Wentworth | 1 |
| Hamilton | Wentworth | 40 | St. Thomas | Elgin | 56 |
| Kingston | Frontenac | 100 | Stratford | Perth | 20 |
| Kossuth | Waterloo | 19 | Toronto | York | 255 |
| London | Middlesex | 374 | Wilton Grove | Middlesex | 15 |
| Lindsay | Victoria | 16 | Wroxeter | Huron | 4 |
| Morriston | Wellington | 6 | Woodstock | Oxford | 19 |
| Milton West | Halton | 26 | Whitby | Ontario | 45 |
| Marden | Wellington | 4 | West Flamboro | Wentworth | 9 |
| Malvern | York | 17 | Watford | Lambton | 10 |
| New Hamburg | Waterloo | 22 | | | |
| Norwich | Oxford | 6 | | | 1,622 |

## LIST OF AWARDS.

Following is a list of prize winners of the Poultry Show of Ontario, at Guelph, 1896 :

### Brahmas—Light.

*Cock.*—John Cole, Hamilton, 91 ; Oldrieve & Wilkinson, Kingston, 89½ ; John Cameron, Galt, 88½.
*Hen.*—Oldrieve & Wilkinson, 94½ ; John Cameron, 92½ ; John Cameron, 90½.
*Cockerel.*—John Cameron, 92 ; John Cole, 90½ ; Oldrieve & Wilkinson, 89.
*Pullet.*—Oldrieve & Wilkinson, 93 ; John Cameron, 91½ ; John Cole, 90.

### Brahmas—Dark.

*Cock.*—J. H. Saunders, London, 91 ; Thorpe & Scott, London, 90 ; Thorpe & Scott, 89½.
*Hen.*—J. H. Saunders, 93 ; Thorpe & Scott, 93 ; J. H. Saunders, 93.
*Cockerel.*—Thorpe & Scott, 93 ; Thorpe & Scott, 91½.
*Pullet.*—Thorpe & Scott, 90½ ; Thorpe & Scott, 90.

### Cochins -Buff.

*Cock.*—Geo. G. McCormick, London, 94½ ; Geo. G. McCormick, 93½ ; Geo. G. McCormick, 92½.
*Hen.*—Geo. G. McCormick, 94½ ; A. W. Bell, Toronto, 93½ ; Geo. G. McCormick, 93½.
*Cockerel.*—Geo. G. McCormick, 95½ ; Geo. G. McCormick, 93½ ; Geo. G. McCormick, 92½.
*Pullet.*—Geo. G. McCormick, 94½ ; Geo. G. McCormick, 94 ; Geo. G. McCormick, 93.

### Cochin—Partridge.

*Hen.*—A. W. Bell, 94 L. G. Pequegnat, New Hamburg, 93½ ; R. Oke, London, 92½.
*Cockerel.*—A. W. Bell, 92½ ; J. L. Corcoran, Stratford, 90½.
*Pullet.*—A. W. Bell, 92½ ; L. G. Pequegnat, 90½ ; J. L. Corcoran, 88.

COCHIN—WHITE.

*Cock.*—Wm. McNeil, London, 92.
*Hen.*—Wm. McNeil, 92½ ; Jos. Foster, Brampton, 90.
*Cockerel.*—Wm. McNeil, 93½ ; Wm. McNeil, 92.
*Pullet.*—Wm. McNeil, 97 ; Wm. McNeil, 94½ ; Jos. Foster, 91½.

PLYMOUTH ROCKS—BARRED.

*Cock.*—E. Dickenson, N. Glanford, 93½, 92½ ; Turpin & Peters, Kingston, 90½.
*Hen.*—J. E. Bennett, Toronto, 93 ; J. E. Bennett, 91½ ; J. E. Bennett, 91½.
*Cockerel.*—E. Dickenson, 92½ ; John Pletsch, Shakespeare, 91½ ; Wm. McLoud, London, 91½.
*Pullet.*—J. E. Bennett, 93 ; Wm. McLoud, 92½ ; Robt. Young, Ponsonby, 91½.

PLYMOUTH ROCKS—WHITE.

*Cock.*—Thos. Rice, Whitby, 93 ; Gallinger Bros, Southend, 91 ; Geo. Bogue, Strathroy, 88½.
*Hen.*—Thos. Rice, 96 ; Thos. Rice, 96 ; Gallinger Bros., 92½.
*Cockerel.*—Thos. Rice, 95 ; Geo. Bogue, 94 ; Thos. Rice, 93½.
*Pullet.*—Thos. Rice, 96 ; J. M. Kedwell, Petrolia, 94½ ; Gallinger Bros., 94.

PLYMOUTH ROCKS—BUFF.

*Cock.*—R. H. Essex, Toronto, 90½ ; R. H. Essex, 90½ ; R. H. Essex, 89.
*Hen.*—R. H. Essex, 92, 89½ ; Milton & Mitcheltree, London, 87.
*Cockerel.*—R. H. Essex, 91½ ; J. Colson, Guelph, 91 ; R. H. Essex, 91.
*Pullet.*—R. H. Essex, 92½ ; Milton & Mitcheltree, 90½, 90.

GAME—BLACK RED.

*Cock.*—Wm. McLoud, 95½ ; Oldrieve & Wilkinson, 94½ ; W. Barber, Toronto, 92.
*Hen.*—John Crowe, Guelph, 94 ; W. Barber, 92½ ; John Crowe, 92½.
*Cockerel.*—Wm. Main, Milton, 95½ ; John Crowe, 94 ; Wm. Main, 93½.
*Pullet.*—John Crowe, 95 ; John Crowe, 94½ ; Wm. Main, 94½.

GAME—BROWN RED.

*Cock.*—Oldrieve & Wilkinson, 94½ ; W. Barber, 88½.
*Hen.*—W. Barber, 93½ ; Oldrieve & Wilkinson, 92½ ; W. Barber, 90½.
*Cockerel.*—W. Barber, 94 ; Oldrieve & Wilkinson, 91½ ; W. Barber, 91.
*Pullet.*—W. Barber, 95½ ; W. Barber, 93½ ; Oldrieve and Wilkinson, 92½.

GAME—DUCKWING.

*Cock.*—W. Barber, 94½ Oldrieve & Wilkinson, 94½ ; W. Barber, 91.
*Hen.*—W. Barber, 94½ ; Oldrieve & Wilkinson, 92 ; W. Barber, 91½.
*Cockerel.*—F. Troth, Toronto, 91½ ; W. Barber, 91 ; F. Troth, 91.
*Pullet.*—W. Barber, 94 ; F. Troth, 93 ; F. Troth, 93.

GAME—PYLE.

*Cock.*—Oldrieve & Wilkinson, 92½ ; H. Sallows, Guelph, 91 ; F. Troth, 90½.
*Hen.*—O'Brien & Colwell, Paris, 95½ ; H. Sallows, 93 ; Oldrieve & Wilkinson, 92½.
*Cockerel.*—G. Chamberlin, Guelph, 92½ ; H. Sallows, 92½ ; W. Barber, 92½.
*Pullet.*—W. Barber, 93½ ; G. Chamberlain, 93 ; W. Barber, 92.

INDIAN GAME.

*Cock.*—Oldrieve & Wilkinson, 94½; R. Dinner, St. Thomas, 93 ; 92½.
*Hen.*—Richard Dinner, 94 ; Oldrieve & Wilkinson, 93½ ; R. Dinner, 92.
*Cockerel.*—W. H. Sloan, Guelph, 94 ; Oldrieve & Wilkinson, 93 ; J. H. Parsons, Port Hope, 92½.
*Pullet.*—R. Dinner, 91½ ; R. Dinner, 90½ ; Oldrieve & Wilkinson, 90.

GAME A. O. S. V.

*Cock.*—Hortop & Gowman, St. Thomas, 1st and 2nd.
*Hen.*—Hortop & Gowman, 1st and 2nd.
*Cockerel*—Hortop & Gowman, 1st and 2nd; C. Reinhart, Guelph, 3rd.
*Pullett.*—Hortop & Gowman, 1st and 2nd; C. Reinhart, 3rd.

GAME BANTAMS—BLACK RED.

*Cock.*—W. Barber, 95½; Oldrieve & Wilkinson, 94½; A. W. Tyson, Guelph, 93.
*Hen.*—W. Barber, 94½; Oldrieve & Wilkinson, 94; A. W. Tyson, 93½,
*Cockerel.*—W. Barber, 94; A. W. Tyson, 91¼; Oldrieve & Wilkinson, 91.
*Pullet.*—W. Barber, 95½; A. W. Tyson, 95; Robt. Howard, Guelph, 94½.

GAME BANTAMS—BROWN RED.

*Cock.*—Oldrieve & Wilkinson, 93; W. Barber, 93; 87½.
*Hen.*—Chas. Bonnick, Eglinton, 93; Oldrieve & Wilkinson, 92½; W. Barber, 91¾.
*Cockerel.*—W. Barber, 94½; 92½; Chas. Bonnick, 91.
*Pullet.*—W. Barber, 94; W. Barber, 92½.

GAME BANTAMS—DUCKWING.

*Cock.*—Oldrieve & Wilkinson, 92; W. Barber, 91½.
*Hen.*—Oldrieve & Wilkinson, 95; W. Barber, 94¼; 93.
*Cockerel.*—W. Barber, 94½; W. Barber, 94; Oldrieve & Wilkinson, 92½.
*Pullet.*—W. Barber, 94; W. Barber, 93; Oldrieve & Wilkinson, 93.

GAME BANTAMS—PYLE.

*Cock.*—Oldrieve & Wilkinson, 95½; W. L. Mitcheltree, London, 95; H. Sallows, 92½.
*Hen.*—Oldrieve & Wilkinson, 93; W. Barber, 92; Hart & Grimoldly, Owen Sound, 91½.
*Cockerel.*—W. L. Mitcheltree, 93½; Hart & Grimoldby, 92½; W. Barber, 92½.
*Pullet.*—W. Barber, 94; Hart & Grimoldby, 93½; Oldrieve & Wilkinson, 93½.

GAME A. O. V.

*Cock.*—T. H. Hortop, 1st and 2nd.
*Hen.*—T. H. Hortop, 1st and 2nd.
*Cockerel.*—T. H. Hortop, 1st and 2nd; C. Reinhart, 3rd.
*Pullet.*—T. H. Hortop, 1st and 2nd; C. Reinhart, 3rd.

BANTAMS—BLACK RED.

*Cock.*—W. Barber, 95½; Oldrieve & Wilkinson, 94½; A. W. Tyson, 93.
*Hen.*—W. Barber, 94½; Oldrieve & Wilkinson, 94; A. W. Tyson, 93½.
*Cockerel.*—W. Barber, 94; A. W. Tyson, 91¼; Oldrieve & Wilkinson, 91.
*Pullet.*—W. Barber, 75½; A. W. Tyson, 95; Robert Howard, 94¼.

BANTAMS—BROWN RED.

*Cock.*—Oldrieve & Wilkinson; 93; W. Barber, 93; W. Barber, 87½.
*Hen.*—C. Bonnick, 93; Oldrieve & Wilkinson, 92½; W. Barber, 91¾.
*Cockerel.*—W. Barber 94½; W. Barber, 92½; C. Bonnick, 91.
*Pullet.*—W. Barber, 94; W. Barber, 92½.

BANTAMS—DUCKWING.

*Cock.*—Oldrieve & Wilkinson, 92; W. Barber, 91½.
*Hen.*—Oldrieve & Wilkinson, 95; W. Barber, 94¼; W. Barber, 93·
*Cockerel.*—W. Barber, 94¼; W. Barber, 94; Oldrieve & Wilkinson; 92½.
*Pullet.*—W. Barber, 94; W. Barber, 93; Oldrieve & Wilkinson, 93.

BANTAMS—PYLE.

*Cock.*—Oldrieve & Wilkinson, 95½; W. L. Mitcheltree, 95; H. Sallows, 92¼.
*Hen.*—Oldrieve & Wilkinson, 93; W. Barber, 92; Hart & Grimoldly, 91½.
*Cockerel.*—W. L. Mitcheltree, 93½; Hart & Grimoldly, 92½; W. Barber, 92¼.
*Pullet.*—W. Barber, 94; Hart & Grimoldly, 93½; Oldrieve & Wilkinson, 93¼.

A. O. V. GAME BANTAMS.

*Cock.*—H. B. Donovan, 94¼; H. B. Donovan, 93.
*Hen.*—H. B. Donovan, 94½; H. B. Donovan, 94.
*Cockerel.*—H. B. Donovan, 96; H. B. Donovan, 92.
*Pullet.*—H. B. Donovan, 94¼; H. B. Donovan, 94.

GOLDEN SEBRIGHT BANTAMS.

*Cock.*—W. McNeil, 94½; R. Oke, 91.
*Hen.*—W. McNeil, 95; R. Oke, 94; Hart & Grimoldly, 91.
*Cockerel.*—R. Oke, 91½; W. McNeil, 91½.
*Pullet.*—R. Oke, 93½; W. McNeil, 93.

SILVER SEBRIGHT BANTAMS.

*Cock.*—W. McNeil, 94; R. Oke, 91.
*Hen.*—R. Oke, 95½; W. McNeil, 93¾.
*Cockerel.*—W. McNeil, 94; R. Oke, 92½.
*Pullet.*—R. Oke, 95; W. McNeil, 91½.

WHITE OR BLACK ROSE COMB BANTAMS.

*Cock.*—W. McNeil, 94½; Oldrieve & Wilkinson, 94½; R. Oke, 92½.
*Hen.*—W. McNeil, 95½; R. Oke, 94; Oldrieve & Wilkinson, 93½.
*Cockerel.*—R. Oke, 94¼; W. McNeil, 94; F. R. Webber, Guelph, 93½.
*Pullet.*—R. Oke, 95½; W. McNeil, 94½; F. R. Webber, 93½.

WHITE COCHIN BANTAMS.

*Cock.*—McNeil, 95½; W. McNeil, 93½; H. B. Donovan 93.
*Hen.*—W. McNeil, 94½; H. B. Donovan. 94; W. McNeil, 91½.
*Cockerel.*—W. McNeil, 94½; H. B. Donovan, 94; H. B. Donovan, 90½.
*Pullet.*—W. McNeil. 95½; H. B. Donovan, 94½; W. McNeil, 94,

BUFF COCHIN BANTAMS.

*Cock.*—W. McNeil, 94; R. Oke, 92.
*Hen.*—W. McNeil, 94; E. J. Eisile, Guelph, 93½; R. Oke, 92.
*Cockerel.*—W. McNeil, 92½; R. Oke, 92½; C. J. Eisile, 91.
*Pullet.*—W. McNeil, 94½. R. Oke, 94½; C. J. Eisile, 93½.

A. O. V. COCHIN BANTAMS.

*Cock.*—W. McNeil, 93; W. McNeil, 91; W. H. Reid, Kingston, 89.
*Hen.*—S. M. Clemo, Galt, 94; W. McNeil, 94; W. McNeil, 94.
*Cockerel.*—W. McNeil, 95; S. M. Clemo, 92; S. M. Clemo, 89½.
*Pullet.*—W. McNeil, 93; W. McNeil, 93; S. M. Clemo, 92,

WHITE BOOTED BANTAMS.

*Cock.*—R. Oke, 92½.
*Hen.*—W. H. Reid, 94; R. Oke; 93½; Oldrieve & Wilkinson, 93½.
*Cockerel.*—R. Oke, 94½; R. Oke, 94.
*Pullet.*—R. Oke, 94.

BLACK TAILED JAPANESE BANTAMS.

*Cock.*—R. Oke, 94½; W. McNeil, 93½; W. H. Reid, 90.
*Hen.*—W. McNeil, 96; R. Oke, 94
*Cockerel.*—R. Oke, 91½; W. McNeil, 91½.
*Pullet.*—W. McNeil, 93½; R. Oke, 93.

POLISH BANTAMS.

*Cock.*—H. B. Donovan, 94; W. McNeil, 92.
*Hen.*—W. McNeil, 96½; H. B. Donovan, 95; R. Oke, 90½.
*Cockerel.*—R. Oke, 94; W. McNeil, 90; H. B. Donovan, 90.
*Pullet.*—W. McNeil, 96½; H. B. Donovan, 95½; R. Oke, 94.

A. O. V. Bantams.

*Cock.*—W. McNeil, 95 ; R. Oke, 88.
*Hen.*—W. McNeil, 97 ; R. Oke, 92½.
*Cockerel.*—W. McNeil, 94 ; R. Oke, 93.
*Pullet.*—R. Oke, 94½ ; W. McNeil, 94 ; H. B. Donovan, 91½.

Black Langshans.

*Cock.*—T. H. Scott, 94 ; Oldrieve & Wilkinson, 92 ; Turpin & Peters, 89½.
*Hen.*—A. T. Little, Churchill, 96½ ; A. T. Little, 95 ; A. T. Little, 94.
*Cockerel.*—T. H. Scott, 95½ ; T. H. Scott, 95½ , H. Karn, Guelph, 94½.
*Pullet.*—T. H. Scott, 95 ; T. H. Scott, 94½ ; H. Karn, 94.

A. O. V. Langshans.

*Hen.*—Knight & Smith, Guelph, 92.
*Cockerel.*—Knight & Smith, 91½ ; Knight & Smith, 89½.
*Pullet.*—Knight & Smith, 93½.

Golden Wyandottes.

*Cock.*—J. H. Magill, Port Hope, 91½ ; Oldrieve & Wilkinson, 91 ; J. H. Magill, 90½.
*Hen.*—Oldrieve & Wilkinson, 93½ ; A. W. Graham, St. Thomas, 93 ; J. H. Magill, 92.
*Cockerel.*—G. W. Blyth, Marden, 92½ ; Oldrieve & Wilkinson, 92½ ; J. H. Magill, 92.
*Pullet.*—J. H. Magill, 95 ; Oldrieve & Wilkinson, 94½ ; A. W. Graham, 94.

Silver Wyandottes.

*Cock.*—Jacob Dorst, Toronto, 93 ; J. E. Meyer, Kossuth, 91½ ; Geo. Bogue, 91.
*Hen.*—Geo. Bogue, 93½ ; Jacob Dorst, 93 ; J. E Meyer, 92.
*Cockerel.*—James Arthur, London, 92½ ; Jas. Arthur, 91½ ; J. E. Meyer, 91.
*Pullet.*—James Arthur, 93½ ; Jacob Dorst, 93½ ; J. E Meyer, 93.

Black Wyandottes.

*Cock.*—Geo. Bogue, 92 ; R. Oke, 91½ ; C. Grimsley, Toronto, 90½.
*Hen.*—C. Grimsley, 94 ; Geo Bogue, 92½ ; R. Oke, 91½.
*Cockerel.*—Jas. Wedgery, Woodstock, 94 ; 93 ; C. Grimsley, 92½.
*Pullet.*—C. Grimsley, 93½ ; C. Grimsley, 93 ; James Wedgery, 92½.

Buff Wyandottes.

*Cock.*—Fred Field, Cobourg, 90.
*Hen.*—J. E. Meyer, 91½ ; Fred Field, 88.
*Cockerel.*—J. E. Meyer, 93½ ; J. H. Magill, 92 ; Fred Field, 91½.
*Pullet.*—J. E. Meyer, 93½ ; J. H. Magill, 93 ; Fred Field, 92.

White Wyandottes.

*Cock.*—N. T. Kettlewell, London, 94½ ; C. Massie, Port Hope, 94½ ; Gallinger Bros., 94½.
*Hen.*—Chas. Massie, 96½ ; N. T. Kettlewell, 95½ ; Chas. Massie, 95.
*Cockerel.*—Chas. Massie, 95½ ; N. T. Kettlewell, 93½ N. . T. Kettlewell, 92½.
*Pullet.*—Chas. Massie, 95½ ; N. T. Kettlewell, 95 ; N. T. Kettlewell, 94½.

White Leghorns—Single Comb.

*Cock.*—Thos. Rice, 93½ ; D. C. Trew, Lindsay, 91½ ; J. Pletsch, 90½.
*Hen.*—Thos. Rice, 95 ; Thos. Rice, 94½ ; A. W. Graham, 94.
*Cockerel.*—Thos Rice, 94½ ; Thos. Rice, 94 ; Thos. Rice, 92½.
*Pullet.*—Thos. Rice, 96½ ; Thos. Rice, 96½ ; D. C. Trew, 95.

Brown Leghorns—Single Comb.

*Cock.*—Thos. Rice, 94 ; Thos. Rice, 93½ ; J. H. Saunders, London, 88½.
*Hen.*—Thos. Rice, 95 ; Thos. Rice, 93½ ; J. R. Wilson, Toronto, 92½.
*Cockerel.*—Thos Rice, 95 ; Thos. Rice, 93½ ; John Pletsch, 92½.
*Pullet.*—Thos. Rice, 96½ ; J. R. Wilson, 95 ; Thos. Rice, 93½.

Black Leghorns—Single Comb.

*Cock.*—No first ; A. G. Brown, Watford, 89½ ; A. G. H. Luxton, Georgetown, 89½.
*Hen.*—A. G. Brown, 92½ ; R. H. Kemp, 92, (Grimsby) ; A. G. Brown, 91½.
*Cockerel.*—A. G. Brown, 93 ; W. M. Osborne, Brockville, 91½ ; R. H. Kemp, 91.
*Pullet.*—A. G. Brown, 95½ ; Readwin & Co., Guelph, 94½ ; A. G. Brown, 94.

BUFF LEGHORNS.

*Cock.*—G. F. Horsford, Port Hope, 90 ; Geo. Whillans, Toronto, 87½ ; G. Berner, Toronto, 85½.
*Hen.*—Geo. Whillans, 90 ; Wagner Incubator Co., 89½ ; Jas. Dundas, Deer Park, 88.
*Cockerel.*—S. F. Baulch, Woodstock, 93 ; Jas. Dundas, 91½ ; G. F. Horsford, 91.
*Pullet.*—Wagner Incubator Co., Toronto, 93 ; Jas. Dundas, 92½ ; Jas. Dundas, 92½.

BROWN LEGHORNS—ROSE COMB.

*Cock.*—Oldrieve & Wilkinson, 93 ; W. McNeil, 91 ; H. M. Henrich, New Hamburg, 90½.
*Hen.*—W. McNeil, 93½ ; Oldrieve & Wilkinson, 92.
*Cockerel.*—W. McNeil, 93½ ; J. L. Page, Woodstock, 92 ; Oldrieve & Wilkinson, 91
*Pullet.*—J. L. Page, 95½ ; J. L. Page, 94 ; W. McNeil, 93½.

WHITE LEGHORNS—ROSE COMB.

*Cock.*—R. Oke, 91½ ; R. Oke, 91½ ; W. J. Bell, Angus, 90.
*Hen.*—W. J. Bell, 95½ ; R. Oke, 93 ; R. Oke, 91½.
*Cockerel.*—W. J. Bell, 93 ; W. J. Bell, 92 ; R. Oke, 91.
*Pullet.*—W. J. Bell, 96½ ; R. Oke, 94½ ; W. J. Bell, 93½.

ANDALUSIANS.

*Cock.*—Newton Cosh, Woodstock, 90½.
*Hen.*—Newton Cosh, 94 ; J. E. Norris, Guelph, 91½ ; W. M. Osborne, 91½.
*Cockerel.*—Newton Cosh, 93 ; Newton Cosh, 91½ ; J. E. Norris, 90½.
*Pullet.*—Newton Cosh, 94½ ; Newton Cosh, 94 ; J. E. Norris, 92.

HAMBURGS—GOLDEN SPANGLED.

*Cock.*—R. Oke, 94½ ; W. McNeil, 94 ; A. Bogue, London, 93.
*Hen.*—W. McNeil, 95 ; A. Bogue, 94 ; R. Oke, 93½.
*Cockerel.*—R. Oke, 95 ; A. Bogue, 94½ ; W. McNeil, 93½.
*Pullet.*—R. Oke, 96 ; W. McNeil, 95 ; A. Bogue, 94½.

HAMBURGS—SILVER SPANGLED.

*Cock.*—W. McNeil, 95 ; R. Oke, 92½ ; A. Bogue, 92.
*Hen.*—R. Oke, 95 ; W. McNeil, 94 ; A. Bogue, 93½.
*Cockerel.*—R. Oke, 96 ; W. McNeil, 93 ; A. Bogue, 92.
*Pullet.*—R. Oke, 95 ; W. McNeil, 94½ ; A. Bogue, 93½.

HAMBURGS—GOLDEN PENCILED.

*Cock.*—W. McNeil ; R. Oke ; W. McNeil.
*Hen.*—W. McNeil ; R. Oke ; A. Bogue.
*Cockerel.*—W. McNeil ; R. Oke ; W. McNeil.
*Pullet.*—R. Oke ; W. McNeil ; W. McNeil.

HAMBURGS—S. P.

*Cock.*—W. McNeil, 93 ; R. Oke, 92.
*Hen.*—R. Oke, 95½ ; W. McNeil, 94 ; A. Bogue, 93½.
*Cockerel.*—R. Oke, 95 ; W. McNeil, 94½ ; A. Bogue, 92½.
*Pullet.*—R. Oke, 96 ; A. Bogue, 92½ ; W. McNeil, 92.

BLACK HAMBURGS.

*Cock.*—W. McNeil ; Oldrieve & Wilkinson ; R. Oke.
*Hen.*—W. McNeil ; R. Oke ; Oldrieve & Wilkinson.
*Cockerel.*—W. McNeil ; R. Oke.
*Pullet.*—W. McNeil ; R. Oke.

DORKINGS—SILVER GREY.

*Cock.*—J. L. Corcoran, Stratford, 94½ ; A. Noden, Toronto, 94 ; J. L. Corcoran, 93.

DORKINGS—SILVER GREY.

*Hen.*—A. Bogue, 95½ ; J. L. Corcoran, 95 ; A. Bogue, 94½.
*Cockerel.*—J. L. Corcoran, 95 ; John McKee, Norwich, 95 ; John Lawrie, Malvern, 94½.
*Pullet.*—A. Bogue, 97½ ; John Lawrie, 95½ ; John McKee, 95.

COLORED DORKINGS.

*Cock.*—John Lawrie, 94 ; J. L. Corcoran, 93½.
*Hen.*—John Lawrie, 96½ ; A. Bogue, 96 ; J. L. Corcoran, 94½.
*Cockerel.*—J. L. Corcoran, 94 ; John Lawrie, 91 ; John Lawrie, 90.
*Pullet.*—J. L. Corcoran, 96½ ; A. Bogue, 96½ ; John Lawrie, 95½.

WHITE DORKINGS.

A. Bogue, 1st and 2nd.
*Hen.*—A. Bogue, 1st and 2nd.
*Cockerel.*—A. Bogue, 1st and 2nd.
*Pullet.*—A. Bogue, 1st and 2nd.

DOMINIQUES.

George Bogue, 1st and 2nd.
*Hen.*—George Bogue ; Oldrieve & Wilkinson ; George Bogue.
*Cockerel.*—Oldrieve & Wilkinson ; George Bogue, 2nd and 3rd.
*Pullet.*—Oldrieve & Wilkinson ; George Bogue, 2nd and 3rd.

BLACK JAVAS.

*Cock.*—Geo. G. McCormack, London, 92½.
*Hen.*—G. G. McCormack, 94½ ; H. M. Henrich, 93 ; H. M. Henrich, 92.
*Cockerel.*—Thos. Brown, Durham, 95 ; Thos. Brown, 94 ; F. R. Webber, 93.
*Pullet.*—G. G. McCormack, 97 ; Bruce & Acres, 94½ ; Bruce & Acres, 94.

JAVAS, A. O. V.

R. Oke, 94½ ; F. R. Webber, 91.
*Hen.*—F. R. Webber, 96 ; 95½ ; R. Oke, 87½.
*Cockerel.*—F. R. Webber, 90½.
*Pullet.*—F. R. Webber, 92½.

BLACK SPANISH.

*Cock.*—Alex. Fraser, New Hamburg, 94½ ; McCormick & Weir, W. Flamboro', 92 ; F. C. Hare, Whitby, 89½.
*Hen.*—J. L. Corcoran, 95 . F. C. Hare, 94½ ; F. C. Hare, 94½.
*Cockerel.*—F. C. Hare, 95½ ; F. C. Hare, 93 ; Alex. Fraser, 93.
*Pullet.*—F. C. Hare, 96 ; 95 ; 95.

BLACK MINORCAS.

*Cock.*—Rev. W. E. Scott & Sons, Ridgetown, 92 ; T. J. Senior, Hamilton, 89½.
*Hen.*—T. J. Senior, 93 ; Scott & Sons, 92 ; 93.
*Cockerel.*—Rev. W. E Scott & Sons, 93½ ; 92½ ; 91.
*Pullet.*—T. J. Senior, 94½ ; Scott & Sons, 94½ ; T. J. Senior, 94.

WHITE MINORCAS.

*Cock.*—No first ; T. J. Senior, 88 ; W. M. Osborne, 88.
*Hen.*—T. J. Senior, 91½ . Scott & Sons, 91 ; Scott & Sons, 90.
*Cockerel.*—W. E. Scott & Sons, 91 ; 88½ ; no 3rd.
*Pullet.*—W. E. Scott & Sons, 92½ ; W. M. Osborne, 92 ; F. Kennedy, Malvern, 91½.

HOUDANS.

*Cock.*—A. Bogue, 92 ; Milton & Mitcheltree, 91½ ; D. C. Trew, 90½.
*Hen.*—D. C. Trew, 94½ ; D. C. Trew, 94 ; Milton & Mitcheltree, 94.
*Cockerel.*—D. C. Trew, 92 ; A. Bogue, 92 ; A. Bogue, 92.
*Pullet.*—A. Bogue, 97 ; D. C. Trew, 94½ ; A. Bogue, 94.

CREVE COEURS.

*Cock.*—R. Oke, 1st.
*Hen.*—R. Oke, 1st and 2nd.

LE FLECHE.

*Cock.*—R. Oke, 1st and 2nd.
*Hen.*—R. Oke, 1st and 2nd.
*Cockerel.*—R. Oke, 1st.
*Pullet.*—R. Oke, 1st.

POLANDS—W. C. B.

*Cock.*—A. Bogue, 94; W. McNeil, 92½.
*Hen.*—W. McNeil, 96; A. Bogue, 94½.
*Cockerel.*—W. McNeil, 94; A. Bogue, 93½.
*Pullet.*—A. Bogue, 97½; W. McNeil, 96½.

POLANDS—GOLDEN OR SILVER.

*Cock.*—A. Bogue, 94½; W. McNeil, 92.
*Hen.*—A. Bogue, 95½; W. McNeil, 93.
*Cockerel.*—A. Bogue, 95; W. McNeil, 93.
*Pullet.*—W. McNeil, 95; A. Bogue, 92½.

WHITE POLANDS.

W. McNeil, 95½; A. Bogue, 91½.
*Hen.*—W. McNeil, 96; A. Bogue, 94½.
*Cockerel.*—A. Bogue, 95; W. McNeil, 94.
*Pullet.*—W. McNeil, 96½; A. Bogue, 95½.

POLANDS—GOLDEN BEARDED.

*Cock.*—W. McNeil, 94; A. Bogue, 93½.
*Hen.*—W. McNeil, 95½; A. Bogue, 93.
*Cockerel.*—W. McNeil, 94½. A. Bogue, 94.
*Pullet.*—W. McNeil, 95; A. Bogue, 94.

POLANDS—SILVER BEARDED.

*Cock.*—A. Bogue, 93½; W. McNeil, 92½.
*Hen.*—A. Bogue, 92½; W. McNeil, 92.
*Cockerel.*—A. Bogue, 95; W. McNeil, 93½.
*Pullet.*—A. Bogue, 93½; W. McNeil, 93.

POLANDS—WHITE BEARDED.

*Cock.*—A. Bogue, 94½; W. McNeil, 92½.
*Hen.*—W. McNeil, 96; A. Bogue, 94½.
*Cockerel.*—A. Bogue, 94; W. McNeil, 92.
*Pullet.*—A. Bogue, 96; W. McNeil, 93½.

POLANDS—BUFF-LACED.

*Cock.*—W. McNeil, 1st and 2nd.
*Hen.*—W. McNeil, 1st and 2nd.
*Cockerel.*—W. McNeil, 1st and 2nd.
*Pullet.*—W. McNeil, 1st and 2nd.

RED CAPS.

*Cock.*—Dr. J. S. Niven, London.
*Hen.*—Dr. J. S. Niven.
*Cockerel.*—Dr. J. S. Niven.
*Pullet.*—Dr. J. S. Niven.

SULTANS.

*Cock.*—R. Oke.
*Hen.*—R. Oke.
*Cockerel.*—R. Oke, 1st and 2nd.
*Pullet.*—R. Oke, 1st and 2nd.

A. O. V. FOWLS.

W. McNeil; H. B. Donovan.
*Hen.*—W. McNeil; H. B. Donovan, 2nd and 3rd.
*Cockerel.*—H. P. Donovan; W. McNeil; H. B. Donovan.
*Pullet.*—H. B. Donovan; W. McNeil.

CROSS-BRED CHICKS.

*Cockerel.*—S. M. Clemo; J. H. Parsons, Osaca.
*Pullet.*—S. M. Clemo; J. H. Parsons; S. M. Clemo.

BRONZE TURKEYS.

*Cock.*—James Ford, Drumquin; William Main; W. H. Beattie, Wilton Grove.
*Hen.*—W. H. Beattie; James Anderson, Guelph; W. J. Bell.
*Cockerel.*—William Main; W. H. Beattie; W. J. Bell.
*Pullet.*—W. H. Beattie; W. J. Bell; William Main.

WHITE OR BLACK TURKEYS.

*Cock.*—W. H. Beattie, 1st and 2nd.
*Hen.*—W. H. Beattie, 1st and 2nd.
*Cockerel.*—W. H. Beattie, 1st and 2nd.
*Pullet.*—W. H. Beattie, 1st and 2nd.

A. O. V. TURKEYS.

*Cock.*—W. H. Beattie.
*Hen.*—W. H. Reid.
*Cockerel.*—James Anderson.
*Pullet.*—W. H. Reid, 1st; James Anderson, 2nd.

TOULOUSE GEESE.

*Gander.*—A. Bogue; J. Pletsch; A. G. H. Luxton.
*Goose.*—A. Bogue, 1st and 2nd; O'Brien & Colwell, 3rd.
*Gander (1896).*—J. Pletsch; McCormick & Weir; O'Brien & Colwell.
*Goose (1896).*—J. Pletsch; McCormick & Weir; McCormick & Weir.

BREMEN GEESE.

*Gander.*—O'Brien & Colwell; William Main; O'Brien & Colwell.
*Goose.*—William Main; O'Brien & Colwell, 2nd and 3rd.
*Gander (1896).*—William Main; O'Brien & Colwell; William Main.
*Goose (1896).*—William Main; O'Brien & Colwell; William Main.

A. O. V. GEESE.

*Gander.*—O'Brien & Colwell; Jos. Foster, Brampton; A. G. H. Luxton.
*Goose.*—O'Brien & Colwell; Jos. Foster; A. G. H. Luxton.
*Gander (1896).*—Jos. Foster; A. G. H. Luxton; W. H. Reid.
*Goose (1896).*—O'Brien & Colwell; A. G. H. Luxton; W. H. Reid.

AYLESBURY DUCKS.

*Drake.*—A. Bogue; F. R. Webber; O'Brien & Colwell.
*Duck.*—A. Bogue; F. R. Webber.
*Drake (1896).*—A. Bogue, 1st and 2nd; W. H. Reid, 3rd.
*Duck (1896).*—A. Bogue; W. H. Reid; F. R. Webber.

ROUEN DUCKS.

*Drake.*—William Main; John Colson; William Main.
*Duck.*—William Main, 1st and 2nd; John Colson, 3rd.
*Drake (1896).*—John Colson; William Main; A. Bogue.
*Duck (1896).*—William Main; John Colson; O'Brien & Colwell.

PEKIN DUCKS.

*Drake.*—A. Bogue; O'Brien & Colwell; A. Bogue.
*Duck.*—A. Bogue; O'Brien & Colwell; A. Bogue.
*Drake (1896).*—A. Bogue; John Colson, 2nd and 3rd.
*Duck (1896).*—O'Brien & Colwell; F. R. Webber; A. Bogue.

A. O. V. DUCKS.

*Drake.*—J. E. Howitt, Guelph; Geo. Bogue.
*Duck.*—J. E. Howitt; Geo. Bogue; A. G. H. Luxton.
*Drake (1896).*—J. E. Howitt; Geo. Bogue; A. G. H. Luxton.
*Duck (1896).*—J. E. Howitt; Geo. Bogue; A. G. H. Luxton.

ENGLISH PHEASANTS.

*Hen.*—R. Oke; Dr. J. S. Niven.

GOLDEN PHEASANTS.

*Hen.*—R. Oke; Dr. J. S. Niven.

SILVER PHEASANTS.

*Hen.*—R. Oke; Dr. J. S. Niven.

A. O. V. PHEASANTS.

*Hen*—Dr. J. S. Niven; R. Oke.

DRESSED FOWLS.

J. H. Parsons, 1st and 2nd.

PIGEONS AND PETS.

BLACK CARRIER.—*Cock.*—H. B. Donovan, 1st; G. J. Dunn, Hamilton, 2nd. *Hen.*—G. J. Dunn, 1st and 2nd.

DUN CARRIERS.—*Cock.*—G. J. Dunn, 1st. *Hen.*—G. J. Dunn, 1st.

A. O. S. C. CARRIER.—*Cock.*—G. J. Dunn, 1st and 2nd. *Hen.*—G. J. Dunn, 1st.

WHITE POUTERS.—*Cock.*—W. M. Anderson, 1st; Magill & Gliddon, Port Hope, 2nd. *Hen.*—C. Massie, 1st; H. G. Doyle, 2nd.

BLUE PIED POUTER.—*Cock.*—Magill & Gliddon, 1st; F. C. Hare, 2nd. *Hen.*—F. C. Hare, 1st and 2nd.

BLACK PIED POUTERS.—*Cock.*—Magill & Gliddon, 1st and 2nd. *Hen.*—Magill & Gliddon, 1st and 2nd.

YELLOW OR RED POUTERS.—*Cock.*—Magill & Gliddon, 1st and 2nd. *Hen.*—Magill & Gliddon, 1st and 2nd.

SHORT-FACED TUMBLERS.—*Cock.*—H. B. Donovan, 1st; J. H. Baulch, 2nd. *Hen.*—H. B. Donovan, 1st; J. H. Baulch, 2nd.

A. O. V. TUMBLERS.—*Cock.*—C. Massie, 1st; H. B. Donovan, 2nd. *Hen.*—H. B. Donovan, 1st; C. Massie, 2nd.

RED BARBS.—*Cock.*—H. B. Donovan, 1st; W. M. Anderson, 2nd. *Hen.*—H. B. Donovan, 1st.

BLACK BARBS.—*Cock.*—W. M. Anderson, 1st; A. W. Tyson, 2nd. *Hen.*—A. W. Tyson, 1st; W. M. Anderson, 2nd.

A. O. C. BARBS.—*Cock.*—H. B. Donovan, 1st.

WHITE TRUMPETERS.—*Cock.*—J. H. Baulch, 1st and 2nd. *Hen.*—J. H. Baulch, 1st and 2nd.

A. O. S. C. TRUMPETERS.—*Cock.*—J. H. Baulch, 1st and 2nd. *Hen.*—J. H. Baulch, 1st and 2nd.

RED OR YELLOW JACOBINS.—*Cock.*—Chas. Massie, 1st and 2nd. *Hen.*—Chas. Massie, 1st and 2nd.

WHITE JACOBINS.—*Cock.*—Chas. Massie, 1st and 2nd. *Hen.*—Chas. Massie, 1st and 2nd.

A. O. S. C. JACOBINS.—*Cock.*—C. Massie, 1st and 2nd. *Hen.*—C. Massie, 1st and 2nd.

R. C. ANTWERP.—*Cock.*—H. B. Donovan, 1s and 2nd. *Hen.*—H. B. Donovan, 1st and 2nd.

ILVER DUN ANTWERP.—*Cock.*—H. B. Donovan, 1st and 2nd. *Hen.*—H. B. Donovan, 1st and 2nd.

WHITE FANTAIL.—*Cock.*—Chas. Massie, 1st and 2nd. *Hen.*—Chas. Massie, 1st and 2nd.

BLUE FANTAIL.—*Cock.*—A. W. Tyson, 1st. *Hen.*—A. W. Tyson, 1st.

A. O. S. C. Fantail.—*Cock.*—W. H. Reid, 1st; W. M. Anderson, 2nd. *Hen*—W. H. Reid, 1st; W. M. Anderson, 2nd.

Show—Homer.—*Cock.*—G. J. Dunn, 1st; H. B. Donovan, 2nd. *Hen.*—G. J. Dunn, 1st; H. B. Donovan, 2nd.

Red or Yellow Magpie.—*Cock.*—H. B. Donovan, 1st and 2nd. *Hen.*—Readwin & Co., 1st; J. E. Howitt, 2nd.

A. S. C. Magpie.—*Cock.*—H. B. Donovan, 1st and 2nd. *Hen.*—H. B. Donovan, 1st and 2nd.

Swallow.—*Cock.*—Readwin & Co., 1st; H. B. Donovan, 2nd. *Hen.*—H. B. Donovan, 1st and 2nd.

Dragoons.—*Cock.*—J. H. Baulch, 1st: H. B. Donovan, 2nd. *Hen.*—H. B. Donovan, 1st; J. H. Baulch, 2nd.

Archangels.—*Cock.*—W. H. Reid, 1st; W. M. Anderson, 2nd. *Hen.*—W. H. Reid, 1st; W. M. Anderson, 2nd.

Nuns.—*Cock.*—H. B. Donovan, 1st; W. H. Reid, 2nd. *Hen.*—H. B. Donovan, 1st; W. H. Reid, 2nd.

Owl.—*Cock.*—H. B. Donovan, 1st and 2nd. *Hen.*—H. B. Donovan, 1st; W. H. Reid, 2nd.

Turbits—Black.—*Cock.*—H. B. Donovan, 1st and 2nd. *Hen.*—H. B. Donovan, 1st and 2nd.

Turbits, A. O. C.—*Cock.*—H. B. Donovan, 1st and 2nd. *Hen.*—H. B. Donovan, 1st and 2nd.

Pigeons, A. O. S. V.—*Cock.*—H. B. Donovan, 1st and 2nd. *Hen.*—H. B. Donovan, 1st and 2nd.

### Rabbits.

Lop-Eared, S. C.—*Buck.*—William Fox, 1st and 2nd. *Doe.*—William Fox, 1st and 2nd.

Lop-Eared, A. O. V.—*Buck.*—William Fox, 1st and 2nd. *Doe.*—William Fox, 1st and 2nd.

Dutch.—*Buck.*—William Fox, 1st and 2nd. *Doe.*—William Fox, 1st and 2nd.

A. O. V. Rabbits.—*Buck.*—William Fox, 1st and 2nd. *Doe.*—William Fox, 1st and 2nd.

Belgian Hares.—*Buck*—William Fox, 1st and 2nd. *Doe.*—William Fox, 1st and 2nd.

### Belgian Canaries.

J. S. Moffat, 1st.

A. O. V. Canaries.—J. S. Moffatt, 1st and 2nd.

### Special Prizes.

For six highest scoring Laced Wyandottes or Barred Plymouth Rocks, $5, Oldrieve & Wilkinson, Kingston, score 556½.

For six highest scoring Asiatics (solid color), $5, Thos. H. Scott, St. Thomas, score 571.

For six highest scoring Asiatics (parti colored), $5, Thorpe and Scott, London, score 550.

For six highest scoring fowls in Mediterranean class, $5, Thos. Rice, Whitby, score 570½.

For six highest scoring game fowls, $5, John Crowe, Guelph, score 565½.

For six highest scoring ducks, barrel of flour, $5, Allan Bogue, London, not all scored.

For six highest scoring Spangled or Pencilled Hamburgs, $3, Wm. McNeil, London, not all scored.

The heaviest turkey on exhibition, $2, Jas. Ford, Drumquin.

The heaviest goose on exhibition, $2, James Main, Milton.

Highest scoring Java cock or cockerel, one dozen silver spoons, $2, Thos. Brown, Durham, score 95.

# EASTERN ONTARIO

# POULTRY AND PET STOCK ASSOCIATION.

# OFFICERS FOR 1897.

| | | |
|---|---|---|
| *President* | G. S. Oldrieve | Kingston. |
| *1st Vice-President* | R. E. Kent | Kingston. |
| *2nd Vice-President* | C. J. Devlin | Ottawa, 42 Turner Street. |
| *Secretary-Treasurer* | Francis H. Gisborne | Ottawa, 69 Mackay Street. |
| *Auditors* | E. Daubney | Ottawa, P. O. Dept. |
| | E. L. Taylor | Ottawa. |

*Board of Directors.*

| | | | |
|---|---|---|---|
| C. W. Young | Cornwall. | J. Nichol | Kingston. |
| John Mason | Ottawa. | James Jacques | Ottawa. |
| F. J. Blake | Almonte. | W. M. Osborne | Brockville |
| W. H. Reid | Kingston. | Wm. Gray | Ottawa. |
| W. Bailey | Kingston. | | |

# LIST OF MEMBERS FOR 1897.

| Name. | Post Office. | Breeds exhibited. |
|---|---|---|
| A. Thompson | Allan's Corners, Que. | W. Plymouth Rocks, Turkeys, Ducks and Geese. |
| C. J. Daniels | Toronto | L and D. Brahmas, B. and P. Cochins, W. and Buff P. Rocks, Indian and Sumatra Games, G. and W. Wyandottes, Black and Buff Leghorns, S. S. Hamburgs, Col. Dorkings, W. and B. Javas, W. Minorcas, Houdans, Red Caps, W. Leghorns, Buff Cochin Japanese, Black Red Game and Black Cochin Bantams. |
| Oldrieve & Wilkinson | Kingston | L. Brahmas, B. Langshans, B. and W. P. Rocks, W. and G. Wyandottes, B. Minorcas, S. C. W. Leghorns, R. C. Brown Leghorns, all varieties Games and Game Bantams, B. Hamburgs, Houdans, Red Caps, Dominiques, R. C. Black Bantams, W. Booted Bantams, Bronze Turkeys, Pekin Ducks. |
| W. M. Baillie | " | W. and Buff P. Rocks, W. and G. Wyandottes. |
| G. Nichol | " | |
| R. E. Kent | " | |
| W. H. Reid | " | Javas, B. and W., B. and W. P. Rocks, B. Spanish, Andalusians, S. C. W. and B. Leghorns, R. C. White Leghorns, Black S. S., G. S., and S. P. Hamburgs, W. C. Black, G. and S. Polish Houdans, S. G. Dorkings, W. Wyandottes, Guinea Fowls, Turkeys, Ducks, Geese, Pigeons and Bantams. |
| Robt. Coffey | " | Black Minorcas. |
| W. J. Wartman | " | B. Spanish, S. C. W. and S. C. B. Leghorns and Andalusians. |
| S. N. Graham | " | B. and W. Minorcas, S. C. White and Buff Leghorns. |
| W. J. McNeil | " | W. Plymouth Rocks, Homer Pigeons. |
| H. Richardson | " | |
| G. Richardson | " | |
| B. Robertson | " | |
| T. Robertson | " | |
| J. Swift | " | |
| D. Rogers | " | |
| G. Smith | " | |
| V. Fortier | Ste. Scholastique, Q. | Buff Cochins, Polish Houdans, Sumatras and Ornamental Bantams. |
| J. Jacques | Ottawa | B. Plymouth Rocks, Buff Cochin Bantams. |
| S. Short | " | B Plymouth Rocks, White Wyandottes. |
| E. L. Taylor | " | B. Plymouth Rocks. |
| A. A. Blyth | " | White Leghorns. |
| G. Higman | " | Golden and White Wyandottes. |
| E. H. Benjamin | " | Buff Plymouth Rocks. |
| C. J. Devlin | " | Barred Plymouth Rocks. |
| F. H. Gisborne | " | White Wyandottes and Ducks. |
| J. Mason | " | White Plymouth Rocks |
| Gray & Baldwin | " | Buff Leghorns and Game Bantams. |
| W F. Garland | Hintonburg | W. Javas, B. P. Rocks and Red Caps. |
| J. C. Smith | " | Bronze Turkeys. |
| H. G. Cawdron | Ottawa | Black Langshans. |
| J. I. Gill | " | White and Brown Leghorns, B. Turkeys. |
| E. A. Connell | " | Brown Leghorns. |
| Joel Teague | " | W. C. Black Polish. |
| John Ashworth | " | Light Brahmas, Black Minorcas, Dorkings, Barred P. Rocks, B. Langshans, White Leghorns, White Wyandottes and Pekin Ducks. |
| P. Nettbohm | " | White Wyandottes. |
| Colonel Hon. M. Aylmer | " | Barred Plymouth Rocks. |
| Fred. James | " | Barred Plymouth Rocks. |
| W. Taggart | " | Brown Leghorns. |
| J. Manuel | " | |
| W. M. Osborne | Brockville | Andalusian, B. and W. Minorca, S. C. White and S. C. Black Leghorns and S. S. Hamburgs. |
| Geo. C. Howison | " | White Wyandottes. |
| Bedlow & Dowsley | " | Colored Dorking, Black Spanish, S. C. Brown Leghorn, Buff Cochin Bantam, Bronze Turkeys. |

LIST OF MEMBERS.—*Concluded.*

| Name. | Post Office. | Breeds exhibited. |
|---|---|---|
| L. R. Cossitt | Brockville | Partridge Buff and White Cochins, W. and G. Wyandottes and Light Brahmas. |
| J. H. Parsons | Osaca | W. P. Rocks, Buff Leghorns and Indian Games. |
| Robt. Craig | Almonte | S. C. White Leghorns. |
| P. McGregor | " | Andalusians. |
| W. F. Lowe | " | Buff Leghorns. |
| F. J. Blake | " | S. L. and G. Wyandottes and Black Minorcas. |
| Chas. Larose | Cornwall | Light Brahmas, S. L. Wyandottes, Barred Plymouth Rocks and S. C. White Leghorns. |
| C. W. Young | " | White Javas. |
| J. H. Warrington | " | Langshans, Black Spanish, S. C. Brown and S. C. White Leghorns. |
| W. Stewart & Son | Menie | Dark Brahmas, Partridge Cochin, B. Langshans, S. G. Dorking, S. C. Brown, S. C. Black and R. C. B. Leghorns, Indian Games and Red Caps, Turkeys, Geese and Ducks. |
| James A. Neilson | Lyn | S. G. and Colored Dorkings, W. P. Rocks, S. L. and W. Wyandottes, S. C. Brown and R. C. White Leghorns, Indian Games, Houdans, W. Plymouth Rocks, G. S. Hamburgs, W. C. Black Polish, Bronze Turkeys, Pekin and Aylesbury Ducks. |
| J. A. Cardwell | Toronto | Buff Wyandottes. |
| F. Field | Cobourg | Black R. Game, Golden Polish, Buff Wyandottes. |
| W. T. Gibbard | Napanee | Barred Plymouth Rocks, Indian Games. |

## FINANCIAL STATEMENT.

The following is the Financial Statement of the Eastern Ontario Poultry Association, made to the Department of Agriculture of Ontario, for the year ending September, 1896.

| Receipts. | $ c. |
|---|---|
| Members' fees | 53 00 |
| Donations | 26 90 |
| Legislative grant | 500 00 |
| Receipts from exhibition | 154 90 |
| Interest | 13 28 |
| Paid by exhibitor to refund customs charges | 3 50 |
| | 751 58 |

| Disbursements. | $ c. |
|---|---|
| Balance due treasurer, 1895 | 44 92 |
| Paid for prizes | 332 50 |
| Officers' salaries | 50 00 |
| Postage | 10 20 |
| Printing | 23 25 |
| Advertising | 12 20 |
| Judges' expenses | 64 50 |
| Lumber, insurance, etc | 35 35 |
| Feed for poultry | 12 40 |
| Assistants at exhibition | 23 00 |
| Cleaning hall | 5 75 |
| Fuel and light | 11 73 |
| Balance paid late sec.-treas. | 5 08 |
| Balance on hand | 120 70 |
| | 751 58 |

Examined and found correct.

E. Daubney,
S. Short, } Auditors.

July 21, 1897.

# ANNUAL REPORT

OF THE

# EASTERN ONTARIO POULTRY AND PET STOCK ASSOCIATION.

*To the Honorable the Minister of Agriculture for Ontario :*

SIR,—I have the honor to submit my annual report as Secretary-Treasurer of the Eastern Ontario Poultry Association. Under the Agriculture and Arts Act, 1895, if the exhibition of this Association is held in the same place or within forty miles of the same place for two years in succession the annual subsidy from the Ontario Government would be withheld. The exhibition for 1896 having been held at Ottawa, it was necessary therefore that the exhibition for 1897 should be held in some other place, and at the annual meeting held in September last, Kingston was selected, and the exhibition was accordingly held there from December 29th to January 1st, 1897, both days inclusive. The display of birds, though good, was not quite as large as had been expected, but the quality was excellent. One of the best features was the very large number of birds of the useful and general purpose breeds, and the comparatively small number in the ornamental classes. The directors and officers of this Association have been very keenly alive to the desirability of encouraging to the utmost extent of their power those kinds of fowl that are likely to build up the poultry industry of the country, and the exhibit at Kingston was most encouraging. The entries of Plymouth Rocks, Wyandottes and Leghorns were particularly good, while the increase in favor of the white varieties of those breeds was most noticeable. The large exhibit of white Plymouth Rocks and white Wyandottes was due in great measure no doubt to the exceedingly handsome silver bowl donated by His Excellency the Governor-General, but the light colored breeds are coming to the front as the most desirable market fowl, for the same reason that white ducks always have had the preference, viz., they dress much better for the market. At the recent Boston poultry exhibition white or buff birds (the feathers in buff birds being as is well known usually very light in undercolor), won the prizes in dressed poultry for the best pair of fowls, for the best and most yellow meated pair of fowl, heaviest and best dressed pair of fowl, best dressed pair of chickens of any variety, best and most yellow meated pair of chickens of any breed or kind, best pair of Wyandotte chickens and best pair of broilers. Another noticeable feature was the large size of many of the birds, several Plymouth Rock cocks being over eleven pounds, and these birds were not simply large, they were good in quality too. The white Leghorns have improved wonderfully in size, one pullet that was placed on the scales weighed a good five and a half pounds, and nearly all the birds of that variety were very much larger than those that have been exhibited in past years. It is to be hoped that the breeders of that excellent variety will continue to breed for increased size. Of course size should not be sought to the injury of the breeds' laying qualities, but the large Leghorns not only lay as well as the small, but they lay a much larger egg. A dozen eggs laid by a flock of the same stock as the large pullet belonged to, were probably the largest dozen of white eggs exhibited, but they did not take first prize because they were not uniform in shape.

The exhibit of bronze turkeys included some magnificent birds, but the exhibits of turkeys, ducks and geese was not upon the whole so large or so good as at the last exhibition. This is a portion of the exhibition that should be very carefully looked after, for it is most important that our farmers should be encouraged to breed and keep better

stock than they do. I fancy it will be necessary to do two things: first, increase the prize money offered, for these heavy birds are very costly to send to exhibitions, coops and expressage are alike expensive; and, secondly, provide better accommodation at the exhibitions, both in the way of coops and in the position given to the coops. The turkeys, ducks and geese are too often put in places where they are not seen to advantage.

There were some beautiful game bantams and good birds in some of the other varieties, but the bantams upon the whole were not either a large or a very strong class.

In pigeons there was absolutely no competition except in Homers, and in these there were only two exhibitors. It is quite time that steps should be taken to stop offering prizes for pigeons, especially as the prize money is provided at the expense either of the poultry exhibitors or the Government grant, the pigeon entry money and the contributions to the purse of the Association being entirely insufficient to pay the pigeon premiums. It cannot be believed that the Government of Ontario gives the annual grants to the Poultry Associations for the purpose of assisting fancy pigeon breeding, and I am quite sure that the bulk of those who exhibit poultry would be equally opposed to spending their money in the interests of pigeon fanciers. Of course if pigeon breeding was carried on in Canada as a practical business it would be a very different matter, but pigeon raising is not at the present time to be considered as among the agricultural industries of the country.

The attendance at the Kingston exhibition was a great disappointment. New Year's week had been selected in the hope that this would have insured a large number of spectators, the show was in the very centre of the city with the market adjoining, yet on no occasion was the building even fairly well filled. It is of the utmost importance that these exhibitions should be well attended, and by the right class of visitors, too. The first and principal reason why these poultry associations should be encouraged is that they induce people to keep improved stock, and unless improved stock is kept the farmers would have no opportunity of improving theirs. For it must be remembered that it is not the ordinary farmer, or indeed one may say any farmer at all, that is engaged in the task of improvement of poultry or in the methods of poultry keeping, though it is the intelligent farmer that reaps the advantage. It is to the poultry specialist—the poultry fancier—that this work falls, and unfortunately there are very, very few farmers in the "fancy," as they call it in the old country. The periodic competition creates a spirit of emulation and causes constant improvement; but be it well noted that the improvement of lacing, of feathers, of size and shape of combs and crests, in smallness of bantams and such like, is not "improvement" from the industrial point of view. The annual exhibition is necessary to the existence of the fanciers, and they are so scattered and comparatively so few in number that it is not possible for them to do the work they are capable of without the assistance of the Government grants. If the grants were withdrawn the result would be that a number of small shows would be held throughout the Province. In each locality where there are a number of poultry fanciers you will find one or two, seldom more, keeping the same breeds, and in a local show you would rarely find that keen competition so necessary to improvement. In many varieties there would only be a single exhibitor year after year. The annual exhibitions are no doubt of great value in inducing many persons of the greatest intelligence to keep poultry who otherwise would not do so, in preserving flocks of thoroughbred poultry from which farmers can draw to improve their stock, and in furnishing an incentive to the improvement of the different breeds. The next question for consideration is how to make these exhibitions still more directly beneficial to the farmers. It has been suggested that prizes should be offered in competitions for which farmers alone should be eligible; this has been tried but with very poor results; then prizes have been offered for cross-bred birds, for dressed poultry, for eggs, but none of these schemes have met with success. And why? It is because those that it is most essential to reach are not interested enough to make any effort. I would suggest, therefore, that an effort should be made to induce the farmers to attend the exhibitions, and this can only be accomplished by giving free admission. Send, for instance, a number of tickets of admission to the farmers' institutes in the neighborhood; supplement this perhaps by a distribution direct to the farmers as

far as it could be done, or send the tickets to the clergymen of the surrounding parishes, and ask them to use their influence in getting the farmers to visit the exhibition, and above all make the ticket good for the farmer and his wife or daughter, for it is the women-folk who in many cases attend to the poultry. Then arrange as far as is possible to have competent and reliable persons available at the exhibition to give the farmers in attendance any information they may require, or in the afternoon, or at some other convenient time, let some practical man address those present upon poultry keeping—not the description of fancy points, but practical poultry keeping and raising. Of course this all entails work, and where so much is done voluntarily as in the work in connection with this Association, it might not be found possible to compass this programme entirely, but it seems to me that it is a movement in this direction that is required in the interests of the poultry industry.

In the arrangement of the classes there is not very much room for change. The ornamental classes have been cut down by the directors as far as it was possible to do so. It must be always remembered that the ornamental classes contribute to the success of an exhibition in several ways. In the first place they induce many people to visit the exhibition who would not otherwise go; they also enable some of the larger breeders who also show in the useful classes to pay their express and travelling expenses; and they sometimes induce visitors to make purchases, and so begin poultry keeping to the advancement of the industry.

This Association has constantly done what it could to promote the useful classes, and outside the pigeons there is really very little in the ornamental classes that could be advantageously dropped. That these efforts have not been entirely in vain is proved by the splendid show of useful farmers' birds at Kingston. The Association is, also, under a heavy debt to His Excellency the Governor-General for the beautiful silver dish he contributed, and which was won by a magnificent pen of white Plymouth Rocks, the property of Mr. John Mason, one of the directors of the Association.

I enclose herewith the prize list of the Kingston exhibition.

Francis H. Gisborne,
Secretary-Treasurer.

Ottawa, 1897.

## PUBLIC MEETING AT KINGSTON.

On Thursday evening, December 31st, during the exhibition at Kingston, a public meeting was held in the City Council Chamber, at which His Worship, Mayor Elliott, presided. The meeting was opened by an address by Mr. A. G. Gilbert, the Superintendent of the Poultry Department of the Dominion Experimental Farm at Ottawa.

## HINTS ON HANDLING POULTRY.

By A. G. Gilbert, Central Experimental Farm, Ottawa.

The speaker pointed out the different phases of poultry development. There is the specialist, who is likely to use incubators and brooders to hatch out and rear broilers to be placed on the market when they would bring the highest price. The specialist or expert is generally to be found in the neighborhood of a city, large town, or where he can readily reach a good market. To him the incubator and brooder are what the hot-bed is to the market gardener. The aim of the latter is to force his green stuff so that it will reach the market when it is most in demand and likely to receive gilt-edge prices. The aim of the poultry specialist is also to place his artificially hatched and

reared chicks on the market when they are of highest value. When in Montreal in the previous fall he was told that early broilers were in demand at one dollar per pair and even higher. The farmer as a rule used hens to hatch out his chickens and the chickens generally reached market late in the season and when prices were much lower. Yet for a superior quality of poultry, which is much wanted by Montreal poultry dealers, ten cents per pound is willingly paid. It should be the farmer's aim not only to produce the superior quality of poultry wanted but to obtain new laid eggs in winter to sell when the highest prices were paid for them. A new field of profit was opened to the farmer by the Minister of Agriculture, who was arranging a system of cold storage for the transportation of a superior quality of poultry and eggs to the English market, and it now remained for the farmers to produce the superior quality required. There will be no difficulty in obtaining the superior quality of poultry if the breeds which are well known flesh formers are kept. It is well known to all poultry men that cockerels of Barred and White Plymouth Rocks, White, Silver and Golden Wyandottes, Langshans and Brahmas will make such flesh development as to weigh four pounds at end of four months, or eight pounds per pair. Such poultry is not only wanted for export but also for home consumption. The breeds named are also good winter layers. No better all round fowls for the farmer can be had than Plymouth Rocks and Wyandottes. For eggs alone it was hard to excel the Leghorn or Minorca family. A point for the farmers to remember is that all the eggs put into cold storage warehouse for export must be strictly new laid, that is with the flavor intact. It must be borne in mind that no subsequent treatment of a stale egg by cold storage or any other method can restore the lost flavor. Mr. Gilbert then showed how the laying stock should be fed and managed so as to produce eggs in winter. He strongly advocated cut green bones as a morning ration. It was almost a perfect ration for egg production, as the bones embraced lime to make shell as well as material for making the egg. If bones could be procured meat in some shape should be fed, and both cut bone and meat should be given in quantity of one ounce to each hen every morning, or at least three times per week. The afternoon ration should be of grain, and the hens should be sent to roost with full crops. Vegetables or green stuff of some sort and grit were necessary. Every effort should be made to keep the fowls in exercise. There was no doubt that meat, greenstuff and exercise were the great factors in the winter production of eggs. Drinking water should be supplied with regularity and in abundance. The danger of over-feeding, particularly in the morning ration, should be guarded against. At the Experimental Farm the fall previous they had reduced the rations from three to two per *diem* with the result that a much greater number of eggs were laid. An object should be to get the laying stock over their moult early and into winter quarters without being too fat. This could be secured by giving the hens a run in the fields, first removing all the male birds from the breeding pens. If insect life is not in abundance feed cut bone or meat in some shape. Boiled sheep heads broken up with an axe is a splendid food. Feed in proportion as already given for winter layers. If the hens are of the proper age and are well looked after they ought to begin winter laying by end of October and be laying well in November. There can be no doubt that with care and intelligent management the poultry department of the farm can be made to pay well.

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## PROFIT IN EGGS.

By C. W. Young, Cornwall.

The speaker said there was no product for which it was so desirable to establish perfect confidence between buyer and seller as eggs, and there was no branch of agriculture where there was so little chance of overcrowding the market. To produce the very best of eggs, several things were necessary—the fowls must be comfortably housed, fed with care and judgment, and the male birds kept away from the females. The last was most important, as not only would the quality of the eggs be better, but th

yield would be larger. At several of the American experimental stations it had been proved that virgin hens laid at least seventeen per cent. more eggs than when the male bird was with them. Care should also be taken in the gathering and shipping of the eggs. A small rubber stamp should be procured which would stamp the name of the shipper and the date when laid, and the eggs should be put in cases to hold a dozen. To obtain the highest price they should be treated as a fancy, gilt-edged article; the cases should be as neat as a candy box, and it would not be a bad idea to find what color showed the eggs off to the best advantage, and line the cases with cotton or wool of that color. Eggs so packed and shipped, when not more than two or three days old, would fetch forty to forty-five cents a dozen in Montreal, and the demand was practically unlimited. About the middle of November, Mr. Young said, he had an enquiry from a Montreal grocer, asking him if he could supply twenty-five dozen strictly new laid eggs a week at forty cents a dozen, until the middle of February. As he could not do so, he had published the enquiry in his newspaper, but had got only one response, so few farmers were there who laid themselves out for producing eggs in winter. He had put the enquiry in communication with his correspondent, and as a result one farmer was getting the price he spoke of. He had no doubt several hundred dozens could be sold in Montreal weekly at the same price, but they must be strictly first-class, and the shipper must guarantee them with his name and date, and if they were branded "unfertilized" the confidence would be so much the greater.

In the experience of the speaker one great reason why hens did not lay in the winter was that they were too fat. Too much corn was fed, and it was made too easy for the hens to get it. One farmer of his acquaintance had told him that he always swept off the barn floor before throwing down the grain to his hens. This was all wrong. The hen house should have several inches of litter on the floor, cut straw or chaff, planing mill shavings or dry leaves, and the grain being thrown down should be covered with the litter, so that every grain had to be hunted. As a regular ration, oats had proved most satisfactory, with an occasional feed of buckwheat, and corn very seldom, and only in cold weather at nightfall. All grain should be heated before feeding in winter. Cut green bone was a great egg food, and very cheap. It would pay anyone with twenty-five hens to have a cutter.

Referring to Mr. Gilbert's remarks as to the English market for eggs, Mr. Young said he had no desire to belittle that market, but we had a much better one almost at our very doors. The city of New York alone paid over $18,000,000 annually for eggs, and within easy reach of Canadian farmers—there was a city population, all consumers, greater than the entire population of the Dominion. He believed that it would not be long before there would be a better arrangement between the United States and Canada for reciprocal trade, when this great market would again be opened to us, and our eggs could go there in the very best condition, and the long ocean voyage to Britain be saved.

## CHEAP STOCK.

By C. J. Devlin, Ottawa.

The paper I have prepared is about the buying of cheap stock. One party writes that he wants to buy a cock, he does not want show points, he only wants a strong healthy bird; another wants a trio of early hatched Plymouth Rocks, does not want fancy birds but only good layers; still another wants a pair hatched in March or very early in April. The same idea runs through all these communications, and all those that call upon the breeder have the same object in view—they want to buy good breeding stock, good, strong, healthy birds, good layers, but do not want to pay any more for them than they would have to pay for scrubs. Do any of these would-be buyers stop to think what it costs in time and money to produce good healthy breeders and good layers? When a man has by

years of careful selection and the expenditure of much time and money, secured such birds as these parties desire, is he not justified in asking a fair price? Yet if he asks more than the market price for ordinary poultry, the would-be buyer drops out of sight. Oh, he does not want to pay fancy prices!! He does not want show birds!! It takes time, money and intelligence to build up a stock of good layers, a stock of strong and good breeders, and it takes just as close culling as it does for fancy points, for in the fancy birds there is a good deal of in-breeding. If those who want to buy cheap stock expect that breeders who breed for these qualities are going to sell stock for the price of scrubs, they are mistaken. Does the person who wishes to buy March or April hatched birds, stop to think how much more difficult and expensive it is to raise birds at that time of the year than those hatched in May? Of course not; he wants to buy cheap—he wants the early bird for it is worth more. An early hatched pullet kept growing, *i.e.* that it is not allowed to get checked in its growth, begins to lay in November and is easily worth two dollars. She is worth more than that as a breeder, because the habit of early laying is a factor of great value and is transmitted to her progeny. Late hatched birds that mature slowly and begin laying after the price of eggs has dropped, are worth no more than scrubs, for they have the habit of late maturing which they transmit to their posterity, just as the dung hill fowls do. The reason we are getting thirty five and forty cents a dozen for our eggs is because the great bulk of the fowls kept on farms are late hatched, are late in maturing year after year, and never think of laying until the spring. If they were laying in November, we that get our birds out early in the spring, would not be getting the prices we do now. Are we not right in believing that early maturing and prolific stock is worth more than one can buy dung hills for? Would-be buyers ought to understand that cheap stock is cheap stock, and that stock which is culled closely and carefully and systematically bred for a purpose, cannot be sold for the price of scrubs, and moreover, that it will not pay him to buy cheap stock. "Cut your garment according to your cloth,"—better by far buy one good pair than six poor ones—buy the best you can get for the sum you have to invest—not a large number of birds at a low price The day of the plug horse, scrub cow, razor-backed hog is gone, and the day of the scrub hen and the man that raises it ought to be gone too. Especially when there is such fine stock raised in this country that can be bought for very little more than the dung hill hen. If you buy good stock and take good care of it it will pay you well both in birds for the market and also in eggs. The prevailing cheap scrub birds kept with the usual want of care will pay neither the producer nor the consumer.

## A LIVING OUT OF POULTRY.

By E. H. Benjamin, Ottawa.

I hope the short paper I am about to read may be found interesting, and if possible, instructive. There has of late years been so much written and published on the poultry industry that one finds it rather difficult matter to select a subject on which something has not in some shape or other been already brought under your notice.

The purport of this paper is: Can I or you make a living from the poultry business. and can the farmer make a substantial addition to his income?

My idea is therefore this evening to come before you speaking as if I were a farmer, and talk to you as a farmer, believing that by so doing, I can best help to an understanding of the true value of poultry raising to the farmer, and show him how he personally can make a substantial addition to his income. taking eggs as an all the year round crop, differing greatly in that respect from hay, corn, fruits and vegetables which are all harvest crops, and if not marketed at once, expensive buildings have to be prepared to store them, and not a few crops such as potatoes, cabbages and fruits shrink in value by decaying while stored.

Not so with our poultry products, which have a ready market at all seasons of the year, and with eggs as the basis of a poultry business, a steady all the year round income can be commanded. Can you or I therefore make a living in the poultry business? This is a question which comes to us in one form or another, more often than any other question. Sometimes it takes the form of "How much capital will it require to start a poultry business and clear say at least $500 or $600 the first year, and how many hens must I keep to make the income just named?"

These questions take on various forms, but the main idea is or seems to be: Can I make a living raising poultry? This question is always a personal one, and is applicable solely to the one asking the question and it is impossible to answer it either in the affirmative or negative. If it was asked: Can a living be made raising poultry? I would answer unhesitatingly, "Yes, but whether you or I can make a living depends entirely upon the individual. Some men can and do make money and a living by raising poultry, and some fail; the same is true in every business in the world. How many have we seen fail in the various lines of business, as professional men, as merchants, brokers, etc. and even as farmers. These cases do not prove that a living and money cannot and have not been made in those various branches of business. I could give three or four cases that have come under my own knowledge where parties have purchased old and well established dairy businesses and secured the good will of the parties disposing of the same. For a short time all went well, but not having a taste for that line of business, and trusting to their help to look after what they themselves should do, in less than eighteen months they lost all they had invested; and yet this does not prove there is not money to be made and a living secured in that branch of the farming industry. It simply proves that these individuals didn't make a living at it. Just so with poultry raising. There are many abortive attempts at making a living at it and many successful ones. The fact that this or that one could not succeed in the poultry business, and whether you or I can make money and a living, depends wholly upon the individual.

I think I can clearly show to each one's entire satisfaction that there can be cleared at least $2 a year on each fowl kept, making eggs the foundation of the business and raising chickens enough to reproduce the laying stock. This cannot be accomplished and keep the old stock over, for the thirty to thirty-five cents the old fowl each sell for is an important part of the net profit, and the failure to raise early laying pullets to take the place of those old ones cuts into the profits severely. If, however, we get the pullets to lay early in November, and keep them laying through the winter, they will have layed from 150 to 175 eggs a piece before the following November; say in even figures 156, or thirteen dozen, which I think is a fair average. Now twenty-five cents per dozen is a fair average price. This would realize for the eggs $3.25. To this can be added the selling price of the old fowl, say thirty cents each, making a total of $3.55 per fowl. Deduct from that amount for feed say $1.50, and you have a clear profit of $2.05 on each bird. I don't consider this can be taken as an exaggerated case, and is within the bounds of reason. I consider that the farmer could do even better than this. He can feed his fowl for less; he can turn to profitable use materials—the utility of which is not properly understood by the farmer—which are allowed to waste or lie scattered over the barn yard instead of being used in the fowl house. Another important point is keeping the poultry and the poultry house clean and free from all kinds of insects, for nothing will retard the fowl from laying and keep them in an unprofitable condition like being infested with what is called fowl lice. Keep the fowl and the surroundings clean, and spread the chaff from the thrashing on the floor, so as to keep Biddy scratching and in exercise, specially during the winter months.

Now let the farmer or person engaging in this business try and raise 500 chickens for every 100 fowls kept, and save say one hundred of the best pullets to replace the layers, and market the balance as soon as possible after they attain a marketable age. I feel assured a good income could thus be secured of $800 to $900. They should also endeavour to winter from 200 to 250 layers and raise about 1,000 chicks. I think this is quite feasible.

Now when I say a living can be made out of poultry, I do not mean to keep carriages and make extravagant expenses, but have such comforts as one can enjoy at home doing one's own work. This income is equal to that received by the average of families, with rent to pay, milk and vegetables to buy, and other expenses which one would not have on a farm.

It may be said that every one is not capable of taking a farm and with 200 or 250 hens or pullets clear from $800 to $1,000 a year. It may with equal truth be said, that neither can all men make a living in the various lines of business or as professional men. I will acknowledge that there are failures in the poultry business as well as in all other occupations, but we cannot help but bring the fact home to ourselves that the failure is not the fault of the business but of the individual. As an illustration of what can be done, the following is an extract taken from a letter written by a woman to a friend. "If I could only get out of this way of living and back again to a rural home, where I could keep poultry as I used to. Then I always had money and clothing. Many a month I made more clear money with my fowls than my husband did with his crops."

The fowls will lay the eggs if given a fair chance. Of this there is no doubt whatever. The market is ready for all the eggs they can lay and fowl that can be supplied. And the solution of the whole matter is to be found in three short sentences: Hatch chickens early; keep them growing so that the pullets will be matured and laying before the cold weather comes on; and, third, keep them laying by good care housing and food. In these three rules are combined the means of securing a reasonable income and living.

## HOW TO FEED.

By C. J. Daniels, Toronto.

So much has been said and written about poultry that it is a most difficult thing to say or write anything new about the same. Some few weeks ago I received a letter from a lady asking me how I fed and raised my poultry. This gave me thought for the above subject, viz.: how to feed. Most all beginners imagine that the most important question is how to hatch the chicks. If one intends starting out on a large scale he will choose the artificial method of incubation. If he intends to go on a smaller scale no doubt he will use hens for hatching. Opinions seem somewhat divided as to best methods of hatching out the chick—incubator or hen. For my own part the best method I have found is to use hens, and as soon as chicks are hatched, place them in a brooder and reset your hens again. My reasons for doing this are: 1st. I get all the work out of the hen I possibly can. 2nd. No hen will bring up all her brood, some will get lost or trampled on, etc.; this the brooder can not do. In the third place, the chick gets all the feed you give it and not the hen. With a good brooder you can raise every healthy chick you hatch out. And now we have them in the brooder, how are we going to feed? Well, for the first twenty-four hours I do not feed anything at all. Then, for the start, I feed mica crystal grit, chick size. After that you can feed one or both of two things, bread slightly moistened with milk or coarse oatmeal The latter I prefer. For the first ten days chicks ought to be fed at least five times per day. Do not give water for first ten days; after ten days you can fed wheat, cracked corn and other grains. After that the bread or oatmeal need not be fed. If you have plenty of milk you can continue the bread and milk or oatmeal, and give them milk to drink three or four times per week. No doubt milk—sweet, sour or buttermilk—is one of the best foods for growing chicks.

Another good feed I find is small potatoes, smashed up, and ground green bone, bran and oat chop added to it and fed warm. The chick at all times wants to be kept growing; and put on the market at an early date to insure good prices. I have heard lots of people say, "My chickens are eating their heads off" Well, it is not the chickens' fault but the owner's. As soon as chicks are in marketable condition they should be sold, to stop the cost of feed and care It would be wise, if you want eggs in fall and all winter, to keep over your earliest and most promising pullets for that purpose.

## POULTRY RAISING.

By W. M. Osborne, Brockville.

Brother breeders and all who are interested in raising poultry for fancy or profit, I will just make a few remarks on the way I treat my poultry from the egg to the hen. Like most breeders of thoroughbred poultry, I use an incubator for hatching purposes, and I find it is like everything else in the poultry line it needs a little care and good judgment. I u ually mate my birds for breeding purposes about the twentieth of January. Until then I keep all the male birds cooped and separated from the hens, as I think they are far better for breeding purposes when they have been confined and fed up well during the winter months. I usually start to hatch about the latter end of February, so that my first hatch comes off early in April. I leave the chickens in the incubator for about twenty-four hours after they are hatched. They are then taken out and put into brooders, and now your work commences in earnest if you wish to make a success of raising chickens artificially, and it can be done if proper attention is paid. The first meal I give the chicks is dry rolled oats and new milk to drink in small quantities. Feed regularly about four times a day—at day break, about 10 a.m., 4 p.m. and 8 p.m. The last feed I usually fill them right up full for the night. I light a lamp and put it in the brooder and just tap the glass of the brooder; the chicks soon learn what it means. They are fed this way for eight or ten days. After that I feed pure wheat, not screenings, as I think the latter a great waste to buy at any price. I always keep lots of sand and grit before them, and give them all the fresh ground bone and green cabbage they will eat every day. The bottom of brooder is kept covered with about three inches of hay scrapings from the hay loft, which keeps the chicks busy all the time scratching for the small grass seed. I usually keep brooder up to eighty-five or ninety degrees the first week. I use two different styles of brooders, one with heat below the mother and the other with the heat above. I keep them in the first mentioned for the first three weeks and then they are placed in the other. In the latter I keep wheat and cracked corn before them all the time. They are kept in this way until all the frost and snow is gone, and then they are allowed to run in and out of the brooder on to a grass run about six feet square; and then after they get into way of running into the brooder I take away the run and give them full freedom in a young orchard. There is one great and good food that should always be fed to chickens and hens, and that is fresh green bone. I keep it before my stock at all times. I find it makes the chickens grow strong and healthy, and makes the hens shell out the eggs. I have no less than three bone mills now, and the only one that I use is one I made myself. The two I bought are lying on the top floor of the hen house, and have not been used for over a year. They are some of those mills that you read about that a child can run, and when you purchase find it gives the old governor himself all he can do to cut up five or ten pounds of bone. I cut cabbage, turnip, and even hard clinkers for grit, and my mill is as good as the day I finished it. I allow my chickens to roost outside until about December, and then they are taken and put into a hen house with large grass run, and allowed to stay there for a few days until they get used to the hen house, and then they have their freedom to roam in the grass until cold weather. It is a bad thing to let young stock get wet or damp in the fall, as it often brings on colds, and if colds are not taken in time roup will follow. Inside the hen house I keep the floors covered with pine shavings from a planing machine, and this serves as a scratching bed for them. The dropping boards are covered with pine sawdust and are cleaned off every day with a rake. I find that pine shavings and sawdust absorb all smell, and keep the birds perfectly clean and healthy. I always whitewash the hen houses, spring and fall which keeps them sweet and nice. I use patent coal oil perch brackets, and always fill them up once a week, which helps to keep hens free from vermin—their greatest enemies. As soon as cold weather comes—that is, frosty—I start a small bell stove in hen house to keep the dampness and frost out. I do not allow the temperature to rise above 45 or 50 degrees, as I find this keeps the hens in good humour and health. I think it is one

of the greatest mistakes that farmers make not to keep their hen houses warm and comfortable. If they want to get eggs in the winter time they must supply heat. If they don't the food the hen eats goes to supply animal heat instead of eggs. I fumigate my hen house once a month after April until October by burning sulphur, keeping all doors and windows tight for five or six hours. I find this a good thing to keep the vermin out. Never let your poultry get vermin on them—if you do they cannot thrive—and the best way to prevent it is to keep everything clean and sweet about your place. I often feel sorry for the poor birds I see. Last summer I went to look at some hens that the owner asked me examine, as he was getting no eggs at all. The first thing that attracted my attention was the sleeping department which was almost walking away, so I advised him to close windows and doors and burn some sulphur in the house. I met him a few days after, and he told me that there were hardly any vermin left on his fowl. It was a wonder that the birds could live at all in such a place.

The following rules should be carefully observed :

1st. Cleanliness about your poultry house and yards, for it is of the greatest benefit to the health of your birds.

2nd. Never feed them too much, as it makes them fat and lazy ; always keep them a little on the hungry side.

3rd. Keep them busy all day scratching in the litter on the floor for food ; active busy hens are profitable hens.

4th. Keep your house heated to about forty to fifty above zero in cold weather, and you will not want eggs in the winter time.

In conclusion let me state that it is a great mistake for farmers to hatch chickens in July or August, for they will not realize any profit from such birds. It is the early bird that does the winter laying. Chickens should be hatched not later than the fifteenth or twentieth of June to obtain good results. A farmer came to me in the latter end of last July to get a setting of eggs. I told him I could not recommend him to set them at that time of the year as it was too late for chickens. In reply he told me that they very rarely set a hen until harvest time, and I had to explain to him what a mistake this was and the reasons why it was a mistake. Another big mistake made by many who keep small flocks for supplying eggs for family use is in overfeeding ; they often give the birds all they can eat and more too. I find it is far the most profitable plan to keep them hungry at all times. Never fill them up so that they will all group together and look half dead. Give them lots of work to do to earn their living. I throw the grain on the floor in the pine shavings and then I take a rake and cover the grain over with the shavings. This keeps them scratching from daylight to dark, with just short intermissions while they are laying their eggs.

## DUCKS.

By Francis H. Gisborne, Ottawa.

There is probably no branch of poultry raising so profitable as the raising of ducks for the market, and probably no branch that is so little attended to in Canada. I believe there is one breeder near Toronto who has a rather extensive business, but with this exception I have not heard of anyone in Canada who raises ducks upon at all a large scale.

Most farmers who keep ducks raise a few broods which they keep until the birds have finished getting what may be termed their second plumage, and then sell them in the autumn and early winter when the market is glutted with all sorts of poultry and prices are at their very poorest. Even then the ducks pay a fair margin of profit, especially if the care they have received and the number of noxious insects they have

destroyed are taken into account. And here let me state that there is nothing more beneficial to a vegetable garden than to let a few ducks have the run of it in the spring before the crops are planted, and in the autumn after the crops have been harvested. Ducks will thoroughly examine every inch of the ground, and larvæ and adult insects are alike congenial to the duck's palate.

There is not the same difficulty with regard to the selection of the particular breed that it is best to keep, that one experiences in connection with hens, for there are practically only two breeds of ducks that can be kept for commercial purposes—the Aylesbury and the Pekin. There are three other large breeds, the Rouen, the Muscovy, and the Cayuga, but with the Muscovy the duck is very small, not more than two-thirds the size of the drake, the drakes are very quarrelsome and the ducks are poor layers. The Cayuga has the reputation of being slow to mature, and, above all, the plumage being black, the birds do not dress well for the market. This latter objection also holds good against the Rouen. For market purposes there can be no doubt that the choice must lie between the Aylesbury and the Pekin. The English choose the first named, the Yankees the others I say Yankees, though I believe this name only includes the citizens of the New England States, but then our good friends across the line have no national name for their citizens. It is always with feelings of regret that I have to admit that the Rouen duck is out of the run as a commercial bird, for I kept them myself for some years, and found them so thoroughly satisfactory and the birds were such great pets, but the dark feathers are an insuperable objection. We also kept the Aylesbury and found them very satisfactory, but I have no personal experience whatever with the Pekin. There are of course a number of ornamental breeds, and the Call and East Indian ducks, which represent the bantam classes among the ducks, are very attractive. It is however with the commercial aspect of duck keeping that I am at present concerned, so that I will confine myself to a brief consideration of what I will call the two commercial breeds, namely the Pekin and the Aylesbury, and to a short description of the methods of duck raising in vogue in England and in America respectively.

First, with respect to the birds themselves—for, though they are both white ducks in the common acceptance of the term, there is, as every breeder knows, a very marked difference between the two breeds.

The Pekin is a pale cream colour, the Aylesbury a pure white. The Pekin has a deep yellow bill and reddish orange coloured legs and feet, the Aylesbury a pale flesh coloured bill and light orange coloured legs and feet. These are the principal differences that strike the ordinary observer, but there is also a difference in shape between the two breeds. The Pekin is a much squarer bird, that is to say, the body is as deep as it is broad and carries its width and depth from the front of its breast to the back of its tail; the neck is long and large. While the body of the Aylesbury is more curve shaped than square, the neck is slender, and when viewed sideways the outline from the top of the head to the end of the beak is nearly a straight line; in other words the forehead does not rise at an angle to the beak. The principle difference in disposition between the two birds is that the Pekin is a very timid bird, and where they are kept in large numbers great care has to be taken not to frighten them. At night time unusual noises or a lighted lantern brought suddenly among them would make the birds stampede, and many would be injured or trampled to death. In fact in a recent poultry paper I saw it stated that a large breeder in the United States, had his duck yards lighted by lanterns to avoid this trouble. As a result of this timidity the Pekins do not stand travelling very well. The Aylesbury on the other hand is very tame. The Pekin is said to be the better layer. I fancy both birds mature in about the same time, and that their average weight does not differ much. Mr. Rankin, the great Pekin duck raiser in Massachusetts, alleges that the Aylesbury duck is very hard to pluck, but I have been unable to find any confirmation of this statement, and I have made special enquiries upon this point.

The great difficulty poultry men have to meet with is reckless statements, or statements made upon very insufficient ground, with respect to this breed or that, or as to this method or that. This difficulty will, I trust, be met in the future by the careful experi-

ments being made in the various experimental stations operated by Governments both in Canada and the United States, of which the results are from to time published. Please do not however regard these remarks as an attack upon Mr. Rankin, for his experience as a duck raiser is of a very extensive character, but of course everyone has his preference. Mr. Rankin's is for the Pekin duck ; if he had given the Aylesbury the same attention as he has the Pekin, the result of his experience might have been different.

So far for the birds ; now as to the mode of raising. In England, the birds are kept for the most part by the agricultural labourers in small flocks, each man having a few birds kept in an outbuilding or in the cottage itself. The birds have free run being distinguished by marks of paint. The ducks are not allowed out in the morning until they have laid. I may here remark that ducks always lay early in the day, and should not be let out, particularly if they have access to water, until they have laid, or else they are apt to lay in the water when the eggs sink and are lost. At night the ducks are driven home, well fed and comfortably housed. The ducks are not allowed to sit, this task being entrusted to hens. The hens are usually set in round baskets or cheese boxes, with ashes or mould kept damp in the bottom. After hatching, the birds are left with the hens for three or four days, when several broods are put together under one hen, the duckling not requiring so much brooding as young chicks They are not allowed to go into any water, but are kept very clean and dry on barley straw, fed on hard boiled eggs mixed with boiled rice and bullock's liver cut up small, several times a day for a fortnight. Afterwards, they are fed on barley meal and tallow greaves mixed together with water in which the greaves have been boiled ; in some cases horse flesh is used They are never allowed to go out of their pens, but are fed as much as they can eat, always having water with gravel and sand at the bottom before them. There is a peculiar soft white gravel in the Aylesbury district in England which is used for this purpose, and it is said that the exhibition birds from that district get their very beautiful pink bills from constantly scuffling this gravel. Exhibition birds are not allowed out in the strong sun, because it not only tans the plumage but also affects the color of the bill. The great object of the duck raiser is to make his birds grow as rapidly as possible so as to attain the maximum weight before they begin to moult, which they do at ten to twelve weeks old. Just before this time, the birds are killed for the market, and it is a strange thing about ducks that at this time they attain almost the maximum weight they will arrive at for some months. If allowed to moult the whole nourishment goes into feather growing and you lose the profit in two ways, in the market price which is always highest in the spring, and in the expense of feeding and caring for the birds for the extra time. In England, matters are so regulated that the ducklings are ready for the market as early as March, sometimes even earlier. In the United States, the industry is managed in an altogether different manner, though the same object is attained, namely : an early spring market and the ducklings killed before before they moult—these two points are the secrets of the whole industry. In the United States, the ducks are kept in very large, indeed enormous flocks. Hundreds of breeding ducks are kept in the larger establishments and thousands of ducklings are raised annually. The eggs are hatched in incubators and raised in brooders, the same care being taken as in England to feed so as to promote the rapidest growth possible. It is stated that at eight weeks the birds will average from ten and a half to eleven and a half pounds, at eleven weeks old fifteen pounds when dressed, and that at twelve weeks, exceptional pairs have been known to weigh as much as eighteen pounds. The American standard of excellence prescribes eight pounds as the standard weight for an old drake, seven each for young drake and old duck and six for a young duck, so that it will be seen that such young birds exceed in weight the standard fixed for the adult duck. It is essential in feeding ducklings to see that they have plenty of water and plenty of sand and fine gravel. The principal duck raisers in the United States mix sand with the soft food so as to ensure the consumption of sufficient to keep the digestion of the birds in a proper state. The growing duckling requires a great deal of animal food and also plenty of green food. It should be remembered that in a state of nature the food of the duck is almost entirely aquatic insects, fish and water weeds, in the consumption of which they swallow large quantities of water and grit. As everyone knows, ducks are

most voracious feeders, and full advantage is taken of this to promote rapid growth. The following table gives a comparative result of a test of growth between chickens and ducklings in an experiment tried at Hammonton, N. J., by P. H. Jacobs and others. As the birds approach maturity, the ratio of gain it will be noticed becomes proportionately less. The ducklings used in the experiment were Pekins, but it does not appear what kind of chickens were used.

| Weeks. | Duck. | Chick. |
|---|---|---|
| | lb. oz. | lb. oz. |
| 1 | .4 | .2 |
| 2 | .9 | .4 |
| 3 | 1. | .6¼ |
| 4 | 1.9 | .10 |
| 5 | 2.2 | .14 |
| 6 | 2.11 | 1.2½ |
| 7 | 3.5 | 1.7½ |
| 8 | 4.0 | 1.12 |
| 9 | 4.8 | 2.0 |

Ducks are subject to very few diseases, but care must be taken to prevent the young birds from becoming infested with vermin, the grey head louse being particularly fatal to young ducklings. After they get their feathers, ducks are not subject to lice. It is also necessary to keep the birds warm and dry. Some people imagine that because the duck is an aquatic bird it likes damp. Nothing could be further from the truth; damp and cold drafts will kill the ducklings like a plague. They generally lose the use of their legs first, and after that speedily succumb. The young birds also require shade. At the earlier stages of their growth, their skulls are very thin and they cannot stand a hot sun.

Not more than five or six ducks should run with each drake, for it must be remembered that in a wild state the duck always mates in pairs. Many people suppose that ducks cannot be kept unless there is a pond or stream available, but water, except for drinking purposes, is not necessary. We kept ducks for years in perfect health with only an occasional wash in a shallow trough made for the purpose. Mr. Rankin says that his strain of Pekins have been bred so long without having free access to water that now they have ceased to care for it, and even when they have access to a pond will only use it for the purpose of washing. These ducks have been so improved by selection and careful breeding that Mr. Rankin has twice had to increase the size of the shipping cases in which he packs his birds for the market; adult birds weighing twelve pounds each being not uncommon. In conclusion, I will only urge upon those interested in raising poultry to give the ducks a trial, and I feel convinced that the success that is bound to follow an intelligent trial of the experiment, will lead to a very important addition to the farmer's income. To those who may be tempted to keep a few ducks to supply the family table, I will say that the birds give very little trouble, are most intelligent and amusing pets, and that their eggs will be a most welcome addition to the larder. Not many people care to use them on the table boiled or fried, etc., but in cookery they will be found to go farther and to be much richer than hens' eggs. I may add that a duck will lay almost as many eggs as a hen. Hullock, a large breeder in the United States, says his birds averaged 135 per annum, and that an average of 120 hens gave 144; but it was not mentioned however what kind of hens they were or what kind of treatment they received.

PRIZE LIST.

LIGHT BRAHMA.

*Cock.*—1st and special, Oldreive & Wilkinson; 2nd, L. R. Cossitt.
*Hen.*—1st and special, Oldreive & Wilkinson; 3rd, L. R. Cossitt.
*Cockerel.*—1st, C. Larose; 2nd and 3rd, Oldrieve & Wilkinson.

DARK BRAHMA.

*Cock.*—1st, C. J. Daniels.
*Hen.*—1st, C. J. Daniels; 2nd, W. Stewart & Son.
*Cockerel.*—1st, C. J. Daniels.
*Pullet.*—2nd, C. J. Daniels.

BUFF COCHIN.

*Cock.*—1st, C. J. Daniels; 2nd, L. R. Cossitt.
*Hen.*—1st, L. R. Cossitt; 2nd, C. J. Daniels.
*Cockerel.*—1st and special, C. J. Daniels.
*Pullet.*—1st, C. J. Daniels.

PARTRIDGE COCHIN.

*Cock.*—2nd, W. Stewart & Son.
*Hen.*—1st, 2nd and special, W. Stewart & Son.
*Cockerel.*—1st, C. J. Daniels.
*Pullet.*—1st, C. J. Daniels.

WHITE COCHINS.

*Cockerel.*—1st, 2nd and special, L. R. Cossitt.

LANGSHAN.

*Cock.*—1st, H. G. Cawdron.
*Hen.*—1st, H. G. Cawdron; 2nd, J. H. Warrington; 3rd, Oldreive & Wilkinson.
*Cockerel.*—1st and special, H. G. Cawdron; 2nd, J. H. Warrington.
*Pullet.*—1st, 2nd and special, H. G. Cawdron; 3rd, Oldreive & Wilkinson.

BLACK JAVA.

*Cock.*—2nd, C. J. Daniels; 3rd, W. H. Reid.
*Hen.*—1st, C. J. Daniels; 2nd and 3rd, W. H. Reid.
*Cockerel.*—1st, C. J. Daniels; 2nd, W. H. Reid.
*Pullet.*—1st, W. H. Reid.

WHITE JAVA.

*Cock.*—1st, C. J. Daniels.
*Hen.*—2nd, C. J. Daniels; 3rd, W. F. Garland.
*Cockerel.*—1st and special, C. J. Daniels; 2nd, W. H. Reid; 3rd, W. F. Garland.
*Pullet.*—1st, C. J. Daniels.

DORKINGS—SILVER GREY.

*Cock.*—1st, J. A. Neilson.
*Hen.*—1st and 2nd, W. H. Reid; 3rd, J. A. Neilson.
*Cockerel.*—1st, W. Stewart & Son; 3rd, W. H. Reid.
*Pullet.*—1st, W. Stewart & Son; 2nd and 3rd, W. H. Reid.

DORKINGS—A. O. V.

*Cock.*—2nd, J. A. Neilson; 3rd, W. H. Reid.
*Hen.*—1st and special, C. J. Daniels; 2nd, W. H. Reid; 3rd, J. A. Neilson.
*Cockerel.*—1st, Bedlow & Dowsley.
*Pullet.*—1st, Bedlow & Dowsley; 2nd, W. Stewart & Son; 3rd, C. J. Daniels.

BARRED PLYMOUTH ROCK.

*Cock.*—1st and special, C. J. Devlin, 90½; 2nd, S. Short, 89½; 3rd, Oldreive & Wilkinson, 88.
*Hen.*—1st and special, Oldreive & Wilkinson and C. J. Devlin (equal), 92; 3rd, C. J. Devlin, 91.
*Cockerel.*—1st and special, Oldreive & Wilkinson, 92½; 2nd, C. J. Devlin, 91½; 3rd, C. Larose, 91.
*Pullet.*—1st and special, C. J. Devlin, 93; 2nd, C. Larose, 91½; 3rd, Oldreive & Wilkinson, 91½.

WHITE PLYMOUTH ROCK.

*Cock.*—1st, Oldreive & Wilkinson, 92; 2nd, J. Mason & Son, 92; 3rd, J. A. Neilson, 89.
*Hen.*—1st and special, Oldreive & Wilkinson, 95; 2nd, J. Mason & Son, 95; 3rd, J. Mason & Son, 93½.
*Cockerel.*—1st and special, J. Mason & Son, 94; 2nd, 2nd, J. Mason & Son, 94; 3rd, C. J. Daniels, 91½.
*Pullet.*—1st and special, J. Mason & Son, 94½; 2nd, J. Mason & Son, 94½; 3rd, J. Mason & Son, 93.

BUFF PLYMOUTH ROCK.

*Hen.*—2nd, C. J. Daniels.
*Cockerel.*—1st and special, C. J. Daniels; 2nd, W. M. Baillie.
*Pullet.*—2nd, C. J. Daniels.

SILVER LACED WYANDOTTES.

*Hen.*—2nd, F. J. Blake.
*Cockerel.*—1st and special, C. Larose; 2nd, F. J. Blake; 3rd, J. A. Neilson.
*Pullet.*—1st and 2nd, F. J. Blake; 3rd, J. A. Neilson.

WHITE WYANDOTTES.

*Cock.*—1st and special, F. H. Gisborne, 93½; 2nd, G. Higman, 92½; 3rd, G. C. Howison, 91½.
*Hen.*—1st, F. H. Gisborne, 94½; 2nd, G. Higman, 94; 3rd, G. Higman, 94.
*Cockerel.*—1st, G. C. Howison, 91½; 2nd, S. Short, 91; 3rd, J. A. Neilson, 90½.
*Pullet.*—1st and special, G. Higman, 95½; 2nd, G. C. Howison, 94½; 3rd, F. H. Gisborne, 94½.

GOLDEN LACED WYANDOTTES.

*Cock.*—1st and special and 2nd, Oldreive & Wilkinson; 3rd, W. M. Baillie.
*Hen.*—1st and special and 3rd, Oldreive & Wilkinson; 2nd, C. J. Daniels.
*Cockerel.*—1st and special and 3rd, W. M. Baillie; 2nd, Oldreive & Wilkinson.
*Pullet.*—1st and special and 2nd, Oldreive & Wilkinson; 3rd, F. J. Blake.

BUFF WYANDOTTES.

*Cock.*—1st, F. Field.
*Hen.*—1st, F. Field.
*Cockerel.*—1st and special and 2nd, F. Field; 3rd, A. Cardwell.
*Pullet.*—2nd, F. Field; 3rd, A. Cardwell.

BLACK SPANISH.

*Hen.*—1st and 2nd, W. H. Reid; 3rd, J. H. Warrington.
*Cockerel.*—1st and special, Bedlow & Dowsley; 2nd, W. J. Wartman.
*Pullet.*—1st and special and 2nd, W. J. Wartman; 3rd, Bedlow & Dowsley.

ANDALUSIAN.

*Cock.*—1st and special, P. McGregor.
*Hen.*—1st and special, W. M. Osborne; 2nd, W. H. Reid; 3rd, P. McGregor.
*Cockerel.*—1st and 2nd, P. McGregor; 3rd, W. J. Wartman.
*Pullet.*—1st, W. M. Osborne; 2nd and 3rd, P. McGregor.

BLACK MINORCA.

*Cock.*—1st, R. Coffey; 2nd, Oldreive & Wilkinson.
*Hen.*—1st, R. Coffey; 2nd and 3rd, S. N. Graham.
*Cockerel.*—1st and special, R. Coffey; 2nd, Oldreive & Wilkinson.
*Pullet.*—1st and special, F. J. Blake; 2nd and 3rd, R. Coffey.

WHITE MINORCA.

*Cock.*—1st, W. M. Osborne.
*Hen.*—1st and special, S. N. Graham; 2nd, W. M. Osborne; 3rd, C. J. Daniels.
*Cockerel.*—1st, C. J. Daniels.
*Pullet.*—1st, C. J. Daniels.

S. C. WHITE LEGHORN.

*Cock.*—1st, S. N. Graham; 2nd, W. H. Reid; 3rd, Oldreive & Wilkinson.
*Hen.*—1st, W. H. Reid; 2nd, S. N. Graham; 3rd, Oldreive & Wilkinson.
*Cockerel.*—1st and special, S. N. Graham; 2nd, J. H. Warrington; 3rd, Gill & Hurdman.
*Pullet.*—1st and special, Gill & Hurdman; 2nd, S. N. Graham; 3rd, J. H. Warrington.

S. C. BROWN LEGHORN.

*Cock.*—1st and special, J. A. Neilson; 2nd, Gill & Hurdman.
*Hen.*—1st and special, J. H. Warrington; 2nd, Gill & Hurdman; 3rd, Bedlow & Dowsley.
*Cockerel.*—1st, J. H. Warrington; 2nd, Bedlow & Dowsley; 3rd, J. H. Warrington.
*Pullet.*—1st, J. H. Warrington; 2nd, Gill & Hurdman; 3rd, Bedlow & Dowsley.

S. C. BLACK LEGHORNS.

*Hen.*—1st, C. J. Daniels.
*Cockerel.*—1st and special, W. M. Osborne; 3rd, W. Stewart & Son.
*Pullet.*—1st, W. M. Osborne; 2nd, W. Stewart & Son.

BUFF LEGHORNS.

*Cock.*—1st, C. J. Daniels; 2nd, S. N. Graham.
*Hen.*—1st, special and 2nd, W. F. Lowe.
*Cockerel.*—1st and special, J. H. Parsons; 2nd, C. J. Daniels; 3rd, W. F. Lowe.
*Pullet.*—1st and 2nd, W. F. Lowe; 3rd, C. J. Daniels.

R. C. BROWN LEGHORNS.

*Cock.*—1st and special, Oldreive & Wilkinson.
*Cockerel.*—1st and 3rd, Oldreive and Wilkinson; 2nd, W. Stewart & Son.
*Pullet.*—1st, special and 2nd, Oldreive & Wilkinson.

R. C. WHITE LEGHORN.

*Cock.*—1st, W. Stewart & Son, 91.
*Hen.*—1st, J. A. Neilson, 92½; 2nd, W. H. Reid, 91½; 3rd, W. Stewart & Son, 91½.
*Cockerel.*—1st, W. Stewart & Son, 93; 2nd, W. H. Reid, 92.
*Pullet,*—1st, 2nd and special, W. Stewart & Son, 94½, 94½; 3rd, W. H. Reid, 92.

BLACK HAMBURG.

*Cock.*—1st and special, Oldreive & Wilkinson, 93; 2nd, W. H. Reid, 92½.
*Hen.*—1st and special, Oldreive & Wilkinson, 92; 2nd, W. H. Reid, 92; 3rd, Oldreive & Wilkinson, 87
*Pullet.*—1st and 2nd, W. H. Reid, 92, 90.

GOLDEN PENCILLED HAMBURGS.

*Pullet.*—1st and special, J. A. Neilson, 93.

SILVER PENCILLED HAMBURG.

*Cockerel.*—3rd, W. H. Reid, 85½.

GOLDEN SPANGLED HAMBURG.

*Hen.*—1st and special, J. A. Neilson, 92.
*Cockerel.*—1st, W. H. Reid, 91; 2nd, J. A. Neilson, 89½.

SILVER SPANGLED HAMBURGS.

*Hen.*—1st and 2nd and special, C. J. Daniels.
*Cockerel.*—1st, W. M. Osborne; 2nd, W. H. Reid.
*Pullet.*—1st, W. H. Reid.

W. C. BLACK POLISH.

*Cock*—1st and special, J. Teague, 91.
*Pullet.*—2nd, W. H. Reid, 89½; 3rd, J. A. Neilson, 86.

GOLDEN POLISH.

*Cock.*—3rd, F. Field, 86.
*Hen.*—2nd, F. Field, 88.
*Cockerel.*—2nd, F. Field, 87½; 3rd, W. H. Reid, 85.
*Pullet.*—1st and special, F. Field, 90; 2nd, W. H. Reid, 89½.

SILVER POLISH.

*Cockerel.*—3rd, W. H. Reid, 81½.
*Pullet.*—1st and special, W. H. Reid.

HOUDAN.

*Cock.*—1st, Oldreive & Wilkinson.
*Hen.*—1st, special and 2nd, Oldreive & Wilkinson; 3rd, C. J. Daniels.
*Cockerel.*—1st, J. A. Neilson; 3rd, Oldreive & Wilkinson.
*Pullet.*—2nd and 3rd, Oldreive & Wilkinson.

RED CAPS.

*Cock.*—1st, W. Stewart & Son; 2nd, Oldreive & Wilkinson.
*Hen.*—1st and special, C. J. Daniels; 2nd, W. Stewart & Son; 3rd, Oldreive & Wilkinson
*Cockerel.*—1st, C. J. Daniels; 2nd, W. F. Garland; 3rd, W. Stewart & Son.
*Pullet.*—1st, C. J. Daniels; 2nd, W. Stewart & Son; 3rd, W. F. Garland.

OTHER STANDARD VARIETIES.

*Cock.*—1st, C. J. Daniels.
*Hen.*—1st, C. J. Daniels; 2nd, Oldreive & Wilkinson.
*Cockerel.*—1st, Oldreive & Wilkinson; 2nd, C. J. Daniels.
*Pullet.*—1st and 3rd, Oldreive & Wilkinson; 2nd, C. J. Daniels.

BLACK B. RED GAMES.

*Cock.*—1st, special and 2nd, Oldreive & Wilkinson; 3rd, F. Field.
*Hen.*—1st and special, F. Field; 2nd and 3rd, Oldreive & Wilkinson
*Cockerel.*—1st, F. Field; 2nd, Oldreive & Wilkinson
*Pullet.*—1st and 2nd, Oldreive & Wilkinson; 3rd, F. Field.

BROWN RED GAMES.

*Cock.*—1st, special and 2nd, Oldreive & Wilkinson.
*Hen.*—1st, special and 2nd, Oldreive & Wilkinson.
*Cockerel.*—1st and 2nd, Oldreive & Wilkinson.
*Pullet.*—1st and 2nd, Oldreive & Wilkinson.

DUCKWING GAMES.

*Cock*—1st, special and 2nd, Oldreive & Wilkinson.
*Hen*—1st and special, Oldreive & Wilkinson.
*Cockerel.*—1st, Oldreive & Wilkinson.

RED PYLE GAMES

*Cock*—1st and special, Oldreive & Wilkinson.
*Hen.*—1st, special and 2nd, Oldreive & Wilkinson.

CORNISH INDIAN GAMES.

*Cock.*—1st and special, Oldreive & Wilkinson; 2nd, J. H. Parsons, 3rd, C. J. Daniels.
*Hen.*—1st, special and 2nd, Oldreive & Wilkinson; 3rd, J. H. Parsons.
*Cockerel.*—1st and 3rd, Oldreive & Wilkinson; 2nd, J. H. Parsons.
*Pullet.*—1st, C. J. Daniels; 2nd, J. H. Parsons; 3rd, Oldreive & Wilkinson.

OTHER STANDARD GAMES.

*Cock.*—1st, C. J. Daniels.
*Hen.*—1st and 2nd, C. J. Daniels.
*Cockerel.*—1st and 2nd, C. J. Daniels.
*Pullet.*—1st and 2nd, C. J. Daniels.

BLACK RED GAME BANTAMS.

*Cock.*—1st and special, Gray & Baldwin; 2nd and 3rd, Oldreive & Wilkinson.
*Hen.*—1st, special and 2nd, Oldreive & Wilkinson; 2nd, Gray & Baldwin.
*Cockerel.*—1st, Gray & Baldwin; 2nd and 3rd, Oldreive & Wilkinson.
*Pullet.*—1st, Oldreive & Wilkinson; 2nd and 3rd, Gray & Baldwin.

BROWN RED GAME BANTAMS.

*Cock.*—1st and special, Oldreive & Wilkinson; 2nd, Gray & Baldwin.
*Hen.*—1st and special, Oldreive & Wilkinson; 2nd, Gray & Baldwin.
*Cockerel.*—1st, Gray & Baldwin.
*Pullet.*—1st, Gray & Baldwin.

DUCKWING GAME BANTAMS.

*Cock.*—1st and special, Gray & Baldwin; 2nd, Oldreive & Wilkinson.
*Hen.*—1st and special, Oldreive & Wilkinson; 2nd; Gray & Baldwin.
*Cockerel.*—1st, Gray & Baldwin; 2nd, Oldreive & Wilkinson.
*Pullet.*—1st and 2nd, Gray & Baldwin; 3rd Oldreive & Wilkinson.

RED PYLE GAME BANTAMS.

*Cock.*—1st and special, Gray & Baldwin; 2nd and 3rd, Oldreive & Wilkinson.
*Hen.*—1st, special and 3rd, Oldreive & Wilkinson; 2nd, Gray & Baldwin.
*Cockerel.*—1st, Gray & Baldwin; 2nd and 3rd. Oldreive & Wilkinson.
*Pullet.*—1st and 3rd, Oldreive & Wilkinson; 2nd, Gray & Baldwin.

GOLDEN SEBRIGHT BANTAMS.

*Hen.*—2nd, W. H. Reid.
*Cockerel.*—1st, W. H. Reid.
*Pullet.*—1st and special, W. H. Reid.

SILVER SEBRIGHT BANTAMS.

*Hen.*—2nd, W. H. Reid.
*Cockerel.*—1st, W. H. Reid.
*Pullet.*—1st and special, W. H. Reid.

R. C. BLACK BANTAMS.

*Cock.*—1st and special, Oldreive & Wilkinson.
*Hen.*—1st and 2nd, Oldreive & Wilkinson; 3rd, W. H. Reid.
*Cockerel.*—1st and 3rd, Oldreive & Wilkinson; 2nd, W. H. Reid.
*Pullet.*—1st and 2nd, Oldreive & Wilkinson; 3rd, W. H. Reid.

BUFF COCHIN BANTAMS.

*Cock.*—1st, C. J. Devlin; 2nd, W. H. Reid; 3rd, C. J. Daniels.
*Hen.*—1st, 3rd and special, W. H. Reid; 2nd, C. J. Daniels.
*Pullet.*—1st, C. J. Daniels; 2nd and 3rd, Bedlow & Dowsley.

JAPANESE BANTAMS.

*Cock.*—1st and special, W. H. Reid; 2nd, C. J. Daniels.
*Hen.*—1st, C. J. Daniels; 2nd, W. H. Reid.
*Cockerel.*—2nd, W. H. Reid.
*Pullet.*—1st and 2nd, W. H. Reid; 3rd, C. J. Daniels.

OTHER VARIETIES BANTAMS.

*Cock.*—1st, W. H. Reid; 2nd, C. J. Daniels.
*Hen.*—1st and 3rd, W. H. Reid; 2nd, C. J. Daniels.
*Cockerel.*—1st and special, Gray & Baldwin; 2nd, C. J. Daniels.
*Pullet.*—1st, C. J. Daniels.

WHITE EGGS.

1st, S. N. Graham; 2nd, A. A. Blyth; 3rd, Gill & Hurdman; 4th, W. H. Reid.

COLORED EGGS.

1st, C. J. Devlin; 2nd, G. S. Oldreive; 3rd, W. H. Reid.

GUINEA FOWLS.

1st, C. J. Daniels.

BRONZE TURKEYS.

*Cock.*—1st, W. Stewart & Son; 2nd, W. H. Reid; 3rd, Oldreive & Wilkinson.
*Cockerel.*—1st, Oldreive & Wilkinson; 2nd, W. Stewart & Son; 3rd, W. H. Reid.
*Hen.*—1st, J. A. Neilson; 2nd, Oldreive & Wilkinson; 3rd, W. Stewart & Son.
*Pullet.*—1st, Oldreive & Wilkinson; 2nd, W. Stewart & Son; 3rd, Bedlow & Dowsley.

O. V. TURKEYS.

*Hen.*—1st, W. H. Reid.
*Pullet.*—1st, W. H. Reid.

TOULOUSE GEESE.

*Gander.*—1st, W. H. Reid.
*Goose.*—1st, W. H. Reid.

TOULOUSE GEESE, 1896.

*Gander.*—1st, W. Stewart & Son; 2nd, W. H. Reid.
*Goose.*—1st, W. Stewart & Son; 2nd, W. H. Reid.

EMBDEN GEESE.

*Gander.*—1st, W. Stewart & Son.
*Goose.*—1st, W. Stewart & Son.

O. V. GEESE.

*Gander.*—1st, W. Stewart & Son; 2nd, W. H. Reid.
*Goose.*—1st, W. Stewart & Son; 2nd, W. H. Reid.

O. V. GEESE, 1896.

*Gander.*—1st, W. H. Reid.
*Goose.*—1st, W. H. Reid.

ROUEN DUCKS

*Drake.*—1st, W. Stewart & Son.
*Duck.*—1st, W. Stewart & Son.

PEKIN DUCK.

*Drake.*—1st, J. A. Neilson.

PEKIN DUCKS. 1896.

*Drake.*—2nd, J. A. Neilson.
*Duck.*—1st, J. A. Neilson; 2nd, Oldreive & Wilkinson.

AYLESBURY DUCKS.

*Drake.*—1st, W. H. Reid; 2nd, W. Stewart & Son; 3rd, J. A. Neilson.
*Duck.*—1st, W. H. Reid; 2nd, J. A. Neilson.

AYLESBURY DUCKS, 1896.

*Drake.*—1st, W. H. Reid; 2nd, W. Stewart & Son.
*Duck.*—1st, W. H. Reid; 2nd and 3rd, W. Stewart & Son.

O. V. DUCKS.

*Drake.*—1st and 2nd, W. H. Reid.
*Duck.*—2nd, W. H. Reid.

O. V. DUCKS, 1896.

*Drake.*—1st, W. H. Reid.
*Duck.*—1st and 2nd, W. H. Reid.

GOVERNOR-GENERAL'S MEDAL.

The following are the scores of the first three pens competing for the silver bowl offered by His Excellency the Governor-General:

| | J. Mason. | W. M. Baillie. | Oldreive & Wilkinson. |
|---|---|---|---|
| Cock | 92 | 89½ | 92 |
| Hen | 95 | 91 | 95 |
| Hen | 93½ | 93½ | 90 |
| Cockerel | 94 | 90½ | 90½ |
| Pullet | 94½ | 91 | 89 |
| Pullet | 94½ | 90 | 89 |

# ANNUAL REPORTS

OF THE

# DAIRYMEN'S AND CREAMERIES' ASSOCIATIONS

OF THE

# PROVINCE OF ONTARIO

# 1896.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.
DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.
CREAMERIES' ASSOCIATION OF ONTARIO.

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# DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

## TWENTIETH ANNUAL CONVENTION

The Twentieth Annual Meeting of the Dairymen's Association of Eastern Ontario was held in the city of Brockville, on Wednesday, Thursday and Friday, January 6th, 7th and 8th, 1897. It was well attended, and an unusually large number of cheese makers were present, who evinced a keen interest in the proceedings by asking many questions regarding the manufacture of cheese. The reception of the visitors by the local committee was hearty and hospitable.

---

### THE PRESIDENT'S ADDRESS.

By Henry Wade, Toronto.

As the time has now arrived to commence our business, I cheerfully welcome you all to our Twentieth Annual Convention, and the fifth held in the good town of Brockville, where we all feel so much at home. I think everyone is satisfied that these conventions have been of incalculable benefit to the cheese and butter makers of this Province, as well as to the country in general. The objects of this Association are manifold : primarily the improvement in the manufacture of cheese and butter, both quantity and quality, by both precept and example ; also the improvement in dairy utensils and dairy breeds of cattle, whereby farmers of the present day can choose the best breed for dairy purposes, reaping the labors of their predecessors. These conventions also cause the meeting, at least once a year, of the cheese and butter makers, who come together to listen to the addresses of experts from different countries and the general dissemination of knowledge in all branches of this important interest by debates amongst themselves, and by questions asked the experts in both cheese and butter. These meetings are the best educators of the day and age in which we live. Historians of the Province of Ontario, in future days, will hand down to our successors the history of the rise of the dairy interests in this fair province of ours.

According to the Report of the Bureau of Industries, I find in 1895 that 109,230,340 lbs. of cheese were made in factories, valued at 9.70 cents per lb., making a total value of $8,607,389 ; that 4,553,708 lbs. of butter were made in creameries alone, which at 19 cents per lb. would amount to $865,204, or a total value of $9,472,593 in the Province of Ontario. This amount does not include dairy-made cheese or butter.

The exports from the Dominion for 1896, according to the returns from Montreal, of cheese foot up 1,726,000 odd boxes, which is 16,000 more boxes than last year. Cheese last year rated the producers about $6.00 per box, this year they have realized $6.75 per box, or in other words, against a return of $10,260,000 last year, they record about $11,652,000, thus showing the handsome gain of about one million and a half of dollars.

The exports of butter have also been very encouraging. Up to November 24th 157,321 packages of Canadian butter were sent to Great Britain against 69,000 in 1895, and 32,000 in 1894. This shows that our creamery butter has at last established a reputation for itself in England. The returns to the producer represent about $1,890,000 for 1896 against $853,384 in 1895, or over $1,000,000 in one year. This is remarkable, but there is plenty of room for more, as Great Britain consumes $40,000,000 worth in a season. The total value of both cheese and butter amounts to the handsome sum of $13,542,000. Now, how has this been brought about? In the first place by organizing a dairymen's convention at Ingersoll thirty years ago this spring, with the motto of "Progress." For the first fourteen years all that the Association did was to hold conventions, to teach cheese and butter makers while attending, and the holding of cheese shows. In 1881 in this eastern section a new epoch was arrived at by employing Mr. J. B. Harris, of Antwerp, N.Y., to visit and work with fifty-three factories. This proved so satisfactory that for every year since from one to five instructors have been engaged in this eastern half of the Province; and this, to my mind, has been the real cause of the betterment of this important industry. In like manner I believe the creamery Association has employed, at all events, one instructor along this line. A wise Provincial Government has, ever since 1873, granted this Association assistance, and of late, under the able administration of the Hon. John Dryden, from time to time increased this subsidy until it has reached the handsome sum of $2,750, and a similar amount has been given to our sister Association in the west.

Although the Province of Ontario was the first in taking up the assisting of the dairy interest, the Dominion Government of late years has also done a great deal. The most important action of theirs was the appointing of Prof. James Robertson as Dairy Commissioner, and in a thousand ways he has, in that capacity, helped on the dairy interest, by lecturing, advice and practice; and now that he has a practical chief as Minister of Agriculture, in the person of the Hon. Sidney Fisher, we will expect, and be sure to get, very substantial assistance in this cause. In fact they are, both of them, as busy as they can be in making a cold storage system of carriage for dairy products, fruit, eggs and other perishable commodities from the place of production to the market in Great Britain; also, giving assistance to creameries in the Northwest, and other places in this vast Dominion. So in the future, between the assistance given by the Dominion and Provincial Governments, our exports should be largely augmented; and before the next ten years pass over our heads we should again double our income from these important industries; and not only gain in our exports, but in the improvement of our home market. Let us not ship all our best cheese to Europe, but keep some for ourselves. It is very rarely that you can purchase in Toronto good factory made cheese, for nine out of ten of them are not pleasant to the palate. I never dare order cheese to be sent home without tasting it. This should not be, and we cannot educate the palate of the Canadian people by feeding them on the culls of the factories sold for first-class cheese. This is not right, as it discourages families from buying more. I am afraid, though, while poor cheese is made in this country we will have to use it, because it is not fit to ship to Europe; so it behooves us to keep on the good work of sending out instructors to visit every factory, if possible, in the season, which system has been of so much benefit to this eastern district.

Another subject, the branding of our cheese, is a very important one, and, in my opinion, should be done religiously; and the advantages would far exceed the disadvantages of such a system. You would then send out honest cheese. As dairymen in this eastern district, you have achieved success, and are still able to succeed while you work along the right path, and during the summer make the best of cheese, and during the winter make the best of butter. As a class you have to be industrious and frugal. You have succeeded in part, and have made this part of our fair domain a profitable country to live in, while by old fashioned modes of agriculture, raising nothing but grain, your country would have been a desolation. I would have given a good deal in old times, as a cheese-maker, to have had an instructor visit my factory; and to have owned a silo would have been a happiness at that time.

A short time ago the Minister of Agriculture addressed a circular to the two Dairy Associations and the Creameries' Association, asking them to amalgamate, from which I take the following extract:

"The discussion of subjects relating to the choice of cattle, the care, management and food necessary to secure the best results, must always be the same in both cases. Each of these Associations sends out instructors with the view of bringing the quality of the products towards greater excellence and uniformity. As the work of cheese and butter Associations cover the same territory, instructors from each Association must necessarily go over the same ground, where one instructor, competent in both cheese and butter making, could do the work equally well, and thus effect a saving in time and expense."

He also says that he thinks if the amalgamation of all three Associations could be made that a saving of fully $2,000 might be diverted from expense of management towards this necessary grant. Or if thought best, the Eastern and Western Dairymen's Associations might continue to exist; in that case having an executive committee consisting of four members, two of them interested in cheese and two in butter. These two committees would form a central board, whose business it would be to carry forward such work as might be of common interest to both the Eastern and Western divisions of the Association.

The representatives of the Dominion Government, in making any arrangements for carrying out the cold storage or other plans, would necessarily consult with this body. This would lead also to another departure, that of employing a secretary for both branches of the Association, such officer being required to give his whole time to the development of this industry; the whole scheme tending towards greater consolidation, greater unity, and a greater uniformity, both in the work and in the results that would accrue.

By request of the Minister of Agriculture I communicated with the Western Dairymen's Association, and the Creameries' Association, asking them to send committees of four gentlemen to meet a committee of four from this Association at my office in Toronto, on Wednesday, the 30th of December. The following is the result of the meeting:

"A meeting of the delegates from the Creameries' Association, and the Eastern and Western Ontario Dairymen's Associations, was held in the office of Mr. Henry Wade, in the Parliament Buildings, to discuss Mr. Dryden's proposal for the amalgamation of the three organizations.

"The following gentlemen were present: Representing the Creameries' Association: Messrs. D. Derbyshire, President, Brockville; A. Wenger, Ayton; Wm. Halliday, Chesley; R. J. Graham, Belleville. Representing the Western Dairymen's Association: Messrs. A. F. McLaren, M.P., Stratford; John S. Pearce, London; A. Pattullo, M.P.P. Woodstock; J. W. Wheaton, Secretary, London; R. M. Ballantyne, Stratford. Representing the Eastern Dairymen's Association: Messrs. Henry Wade, President, Toronto; T. B. Carlaw, Warkworth; John R. Dargavel, Elgin; Wm. Eager, Morrisburg, and R. G. Murphy, Secretary, Elgin.

"On motion Mr. Henry Wade was appointed chairman of the meeting, and Mr. R. G. Murphy, secretary. The Minister of Agriculture, Hon. John Dryden, was sent for. He expressed his pleasure at the meeting of the various delegates, and his desire to hear what the representatives of the various Associations might have to say. After a prolonged discussion the following resolution was moved by Mr. Derbyshire, and seconded by Mr. A. F. McLaren, and carried unanimously:

'That the three Associations as now existing be amalgamated into two new Associations, to be called the Butter and Cheese Associations of Eastern and Western Ontario, respectively, with an executive committee composed of three representatives from each Association to act as a Central Advisory Board.'

"A vote of thanks to the Minister of Agriculture for his assistance in formulating the lines of the amalgamation was also passed."

So that from this year the dairy interests will be represented by the two Associations, each appointing an executive committee of three to act as an advisory board, to meet, when required, in Toronto; the ordinary work to be carried on as heretofore, at

least in this Association, by having directors act as chairmen in their different localities, to whom the inspectors for that division will report. This has proved very satisfactory in the past, as was explained at the meeting. The dairy requirements are very different to what they were a few years ago when the Creameries' Association started ; that now cheese factories turn their attention after the first of November to butter making, so that a cheese maker has to be a butter maker also So the inspectors in the future will have to understand the manufacturing of both of these commodities.

Another departure this last year has been the granting of a small amount to the Provincial Stock and Dairy Show held in Guelph last December, where premiums were given for the best milch cows of every breed, and a sweepstakes for all breeds ; four entries were made in Ayrshires, six in Holsteins, five in Jerseys and five in grades. The test was made by our worthy secretary, R. G. Murphy, Mr. J. W. Wheaton, of the Western Dairymen's Association, and Mr. G. E. Day, of the Ontario Agricultural College. The result of the sweepstakes was that the celebrated Holstein cow "Calamity Jane," owned by A. & G. Rice, of Currie's, again bore the palm of victory. This winter show has been held a great many years in Guelph, but it is not necessary that it should be held there continually. Why not let it be held twice west of Toronto, then once east of Toronto, where the dairy part of it could be better worked up. The town of Lindsay has already made application for it, and both Peterboro' and Belleville would be suitable points. The good town of Brockville is probably a little too far east for fat cattle to be brought to, otherwise the people down here, with their usual energy, would make it a success. But let us as dairymen not rest satisfied until the Province of Ontario—or better still, as the Province has so many burdens to bear, why should not the Dominion Government, now that a dairyman is Minister of Agriculture, give a subsidy towards holding a purely dairy show on the same lines as the one held in Gananoque two years ago? Brockville would then be a capital point. This show might be held in the east the years that the Provincial Stock Show is being held in the west.

The programme for the conducting of this convention is before you, and although subject to slight changes will be adhered to as much as possible, and I am sure you will agree with me that it is a good one. Ex-Governor Hoard is a host in himself, Prof. Robertson, Prof. Dean and other experts, as well as the two Ministers of Agriculture, the inspectors and other speakers, make a combination of which we may be proud. I again welcome you to this twentieth convention of the Eastern Dairymen's Association. (Applause.)

## COMMITTEES.

The following committees were then appointed :

Business.—D. Derbyshire, R. G. Murphy, E. Kidd.

Nominations.—J. R. Dargarvel, Wm. Eager, James Whitton.

Finance.—Thomas B. Carlaw, E. J. Madden, John McTavish..

Legislation.—William Eager, J. R. Dargavel, H. Wade.

Utensils.—G. G. Publow, G. Bensley, A. P. Purvis.

## A GENERAL REVIEW.

Mr. D. Derbyshire, of Brockville, was then called upon and said he was much pleased at being able to again welcome the representative dairymen of Eastern Ontario to Brockville. It is seven years since an Association convention was held here, and during that time marked changes have been effected in the various departments connected with dairying. A large number of factories have been erected, there is a marked improve-

ment in their construction, and there is likewise an improvement in the makers and the product which they turn out. I am satisfied an improvement has been made in the quality of the cattle kept by the farmers, but there is still plenty of room for further effort in that direction. In fact, the widest scope for advancement now presents itself. Infinitely more care should be taken in the selection of cattle. There is a change going on along various other lines, all tending to secure a lowering of the cost of production. It is not within the power of the Association to raise the price of cheese or butter, because that is controlled by the markets of the world, but it is possible to so educate the producer that the desired profit could be secured, simply by showing him how to reduce the cost of production and at the same time turn out a better article. An important factor in attaining this result is winter butter making. Experience has proved conclusively that it is impossible to make fancy cheese during our winter season, the time best adapted for its manufacture being between the months of May and November. To make good cheese it is necessary to have the same temperature which ensured the making of good bread, and with our present rating for cheese on the English market we cannot afford to send anything over there but that which is of a character calculated to enhance rather than diminish that rating. It is, therefore, our wisest course to turn our attention to butter making in the winter. I find that while Canada held fifty-three per cent. of the English cheese trade, she held only four per cent. of the same market's butter trade. The question was taken up and had been attended with most excellent results, our trade in butter this year increasing to the extent of $1,000,000, and in the change this section, as usual in matters pertaining to dairying, was found in the lead. More factories have been converted into butter making establishments here than in any single section in Canada. And what is more, none of the enterprising men who had taken up the new line had ever asked for or received a dollar's worth of aid from the government. They have made it a success unaided, and I see much to hope for in the future. I think it is quite possible to increase our output of butter next year 50,000 tubs. As to my own attitude towards the Creameries' Association, I have been quoted in a western paper as being opposed to the amalgamation with the Cheese Associations. That was true at one time, but only until such a time as I felt the butter business had been put on a basis where it could stand by itself. It is not long ago that any speaker before a dairymen's meeting, in order to win applause, had but to refer to our good cheese and our very poor butter. That is not so to-day. Our butter is improving every year, and is bound to still further improve. But it is essential that the farmer should keep a better class of cows, feed them as well as now at a less cost and make butter in winter.

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## WHAT MUST THE FARMER OF TO-DAY DO TO SECURE MORE PROFIT IN DAIRYING?

By Ex-Governor W. D. Hoard, Fort Atkinson, Wisconsin.

A wonderfully great and complex interest is this modern dairy industry. It is a long line of intricate problems from the cow in the stable on the humble farm home, up through the modern cheese factory or creamery, the modern refrigerator car, the modern railroad, the great army of middlemen jobbers and dealers, the modern cold storage warehouse, the modern ocean steamship—a great floating refrigerator—another army of jobbers and dealers, to the mouth of the final consumer across the water.

Do you notice that every step of this wonderful food highway, *after* the milk leaves the cow, is lit up with the intense light of modern ideas, modern methods, modern economies? Nothing ancient anywhere on the line but old ocean.

Yet this great interest rests upon the cow back there in the farm stable. She is in the hands of the farmer. Everthing in this great procession must wait for him. Science,

invention, capital and enterprise, have done about all they can do for the fate of his product. Now what will he do for himself? We have come to a point where the future fate of American dairying rests on the way the American farmer will adapt himself to the necessities of the hour.

Believe me, this great dairy interest both in Canada and the United States is now in the greatest peril of its whole history. Only one man can decide its fate. That is the farmer. The oncoming march of competition from every side; the rapid development of the industry in Australia, New Zealand, South America; the progress of invention in the way of improved machinery, cold storage, cheap rail and ocean transportation; the prospective opening of dairy production in Northern Europe and Asia, all point to a great increase of the supply of dairy food in one form or another.

In the meantime, the foreign demand is still in old lines and channels and mostly confined to England. Now most of this march of progress and improvement applies to the dairy product *after* it leaves the farm, not before.

It is this stubborn fact, so dimly seen by the farmer, which has caused me great solicitude. The chain is no stronger than its weakest link. Think of this; as a whole, the Canadian and United States dairy farmers are producing milk as *expensively as they ever did.* Every investigation, every cow census taken proves it.

Beyond him, wonderful reduction in expense has taken place in twenty-five years. The majority of cow farmers are just where they were tweny-five years ago. A few "have heard the blessed sound," have seen the light, have put themselves into the current of economic thinking, but only a few comparatively. Unless these sleeping farmers wake up pretty soon they will be forced out of the business. The merciless march of competition must apply to them as it does to every other man.

They will be ground to powder between two great millstones: The progress and improvement in the cost of producing milk and the consequent butter and cheese, in other countries, together with cheap, safe and quick transportation to the consuming market—that is the upper millstone.

The other, is a steady and unyielding refusal to study how to reduce the cost of producing milk to a point that will defy foreign competition; how to best accommodate himself to this overmastering demand for cheaper dairy food; how to put *more* and *more* intelligent thought and calculation into the farm end of this great business.

I most earnestly believe that so far as actual cost in labor and capital per 100 pounds is concerned, it is just as great with ninety farmers out of every one hundred to-day, as it was twenty-five years ago.

The farmer feels it, but alas, he does not *see* it, and all that it means. He strikes blindly out for relief in every direction except the right one. He looks at every man in the procession of forces, but himself.

There is only one avenue of escape. Will he see it before it is too late to save and maintain his old-time possession of this great interest?

Here is the first proposition: He must make up his mind and shape his methods to produce milk at a large per cent. less cost per 100 pounds, or he will be forced to quit the business. Well, if he quits, what else will he do?

Will he produce grain for the export market, and hope to escape foreign competition? No! Will he produce meat and escape the same competition? No!

Will he keep on in the same old rut and produce milk at cost, down to ten and fifty per cent *less than cost*, as thousands are doing, and take it out in reducing the comforts of modern civilization in his family?

I say to you that in my belief, a large per cent. of the distress and complaint among our farmers is not alone because of hard times, but because they have not learned the great lesson of the age, which is,

CHEAPER PRODUCTION.

Every other link in this great chain is adjusting itself to this great lesson. That is the only way they keep up their profit. The moment the milk leaves the farm, it sets out on a new road where an intelligent vigilant watch is kept over every cent of expense, to see that that cent does its largest work.

Is the farmer doing this with the milk before it leaves the farm?

Now there are three leading factors in this problem which the farmer must keep in constant consideration as guide lines. They are:

(1) The cow. What must she be, and how fed and handled?

(2) The farm. What must that be? How managed?

(3) The result. The cost of milk per hundred pounds.

Now there are the three points of the triangle that include the whole circle.

I am so confident of this that I would almost be willing to guarantee an increase of from fifty to one hundred per cent. in the profits of every dairy farmer in Canada inside of five years, if he would guide himself by the best modern thought on each of these three points. There must be a radical change of ideas on all of these points. All three are tied together. You may have the best cows in the world, but if you manage them badly you will fail. You may be the most skillful feeder, but if you have poor cows to consume that feed you will fail of low cost in milk.

You may have both good cows and skill as a feeder, yet if you are a poor soil manager, do not grow the milk-food crops wisely, do not keep up the fertility and producing power of your farm, you will fail again.

Cross the border into New York and I will show you the working of these mighty truths in the old dairy districts there. I will show you an absolute depreciation of the fertility of the soil in the last forty years so that hundreds of farms cannot produce within thirty to fifty per cent. as much cow food as they did then. I will show you, as a consequence, farms that once sold at $100 an acre, offered to-day without a taker at thirty to fifty dollars an acre. Go to Wisconsin, where different ideas prevail as to cows and farm management, and I will show you a constant increase in the price of farm lands for the past thirty years. The result stares every man in the face: How much does my milk cost me per 100 pounds? It is a ghost that will not down. Every poor cow makes it cost more. Every per cent. in decline of productiveness in your soil makes it cost more.

The market for butter and cheese never asks you what your milk costs you. It does not care. It supposes you are wise enough to ask it for yourself to yourself. Are you? The market is only concerned about two things: The amount offered, and the quality. Nine out of ten farmers are looking at the market end when they should be looking at the cost end. The fate that has overtaken New York threatens Canada.

The natural tendency of cheese farming nearly everywhere, as I can see it, and as it has been conducted, is towards a reduction in the dairy quality of the cow, and a steady impoverishment of the soil. It should not be so; it does not need to be so.

It comes from two causes:

(1) A wrong system of cheese making; receiving milk by weight and not by quality. As a consequence the farmer is forced out of the channel of cow improvement, land improvement, brain and method improvement, into a condition of indifference as to these things.

(2) A wrong estimate by the farmer as to the true basis of the production of milk.

Just the minute he braces up and says to himself: "Henceforth I will produce milk by the cow and by the acre," then you will see him striding towards the great goal of true profit—a low cost of milk per 100 pounds.

Then you will see him wake up to the idea of *producing* a good cow for himself.

Then you will see him studying the deep problems of scientific feeding.

Then you will see him bending his mind to the study of soil enrichment and the production of the largest amount of the best food possible.

Then you will see him snap his fingers in the face of all foreign competition, for he can make milk cheaper than the cheapest.

I pay no attention to the cheese factory or creamery. They are not causes; they are results.

The great problem that is upon us is not: What shall we pay for making cheese or butter. Not what we shall get a pound for the cheese or butter; for what man among us by taking thought unto himself can change the great market rate a penny? But it is: How can I as a farmer make as much profit at fifty cents a hundred as I once did at one dollar? There is light ahead on that question if we will but seek it. Let us saturate our minds and convictions with the three great principles I have stated, and there is not a farmer in all Canada but can make quick and encouraging progress towards securing "more profit in dairying." (Applause.)

Mr. EVERTTS: I would like to know what you would use as the cheapest ration to produce the most milk from the average cow?

Mr. HOARD: I will put the question this way: "What would you use as the cheapest fuel?" This question is an exceedingly important one, and it has just about staggered everyone who has tackled it. We have to contend with, first, the vicissitudes of the season. Then we have to consult what sort of crop will meet the conditions. Where corn can be raised either for feeding dry or as silage, it is the sheet anchor of the farmer. There must be a stop made to a man putting on two acres the work that should be put on only one acre to accomplish the same result. I had a little experiment of my own out at Fort Atkinson. I took an acre of ground, and from it I cut a fair crop of hay. I then manured it, turned it over and sowed it to millet, and cut another hay crop. I next sowed it to rye, and fed the cows upon it for two months. I made that acre produce more than the average man would get off three or four acres. The rye stands there to-day, and will give me ten to twenty days' pasture in the spring. It will then be turned over and planted to corn. I am after the largest production of food to the dollar invested in land and labor, and, as a crop for this, I am convinced that corn stands at the head. I am a great advocate of the silo, not because it adds so much to the corn as that it saves so much of the corn. But I must have some adjunct to the corn. Corn is carbonaceous. I must feed my cow for the production of milk, whether for cheese or butter. We have a good deal to learn in this respect yet. What we do not know would make a duo decimo; what we do know would make a primer. One man says: "What shall I feed my cow for butter?" I simply reply, "If you will show me a cow that gives nothing but butter I will tell you." The cow herself—in her temperament and general make-up—regulates the amount of fat; the feed cannot materially affect that. You must feed for the flow of milk. You must give the cow a good deal of protein or albuminoid matter, and not too much carbonaceous food. She will do best on a thoroughly balanced ration. Her own milk is the most thoroughly balanced ration known. I would advocate the growing of peas for dairy cattle; it is one of the cheapest and best of foods for this purpose. Timothy hay is one of the poorest foods for milch cows. I will give you as much, pound for pound, for corn stalks as for timothy. Corn is selling to-day for $4.50 a ton and timothy hay for $8, and there are a lot of farmers who are feeding timothy hay and trying to sell corn! A ton of corn contains at least four or five times as much milk producing food as a ton of timothy hay.

Mr. EVERTTS: How many tons do you raise to the acre?

Mr. HOARD: It is a pretty fair farm that to-day will average more than a ton of timothy to the acre. We are also learning some other problems. Take this question of roughage, for instance. We can now take straw and use it in place of hay. I have

some patrons who sell their timothy hay and feed straw. A good straw cutter costs but little, and grain can be mixed with the cut straw. If you want to help a man turn him around and get him properly faced, and he will soon adjust himself to his new direction.

Mr. SHAVER: How would you go to work to produce milk?

Mr. HOARD: If I was engaged in butter making my first aim would be to get a cow that would give me the largest percentage of butter-fat per 100 pounds of milk. And no cow can produce butter-fat better than a cow that is constructed to produce butter-fat, just as no horse can produce speed like the horse that is built to produce speed. A man, when I was in Maine, questioned this. I said "Do I understand you to hold that there is nothing much in breed and everything in feed?" He said, "That's the size of it." I replied, "Will you please explain to me, then, how 'J. I. C.' could trot a mile in 2.10 on twelve quarts of oats? There are horses right here that could not trot a mile in five minutes on ten tons of oats.'" (Laughter and applause.) It was hard to convince him. As the old Hoosier said of the dying horse, "His eyes is sot." The animal regulates the percentage of butter-fat, but the feed and care regulate the flow and the flavor of the milk. No amount of feed can make a Holstein out of a Jersey, or a Jersey out of a Holstein. We cannot change the breeds except by a long system of selection. If I am to make milk for city consumption I would get a breed like the Holstein or the Ayrshire. If I am to get milk for cheese making I am in a little bit of a quandary. If in a community practising the pooling system, I would be inclined to do as they do—run to quantity and pay little or no heed to quality; but the proper thing to do is to get the milk sold according to quality as well as weight for cheese making. Some of the best cows in Jefferson county have Ayrshire mothers and Jersey fathers. Aim for better form in the animal, and better quality and yield in her milk will generally accompany that.

Mr. DERBYSHIRE: What would you do if your patrons would not go in for the butter-fat standard?

Mr. HOARD: I would just keep on preaching the gospel of a better way.

Mr. BRESEE: What kind of ration will best produce milk at this time of year?

Mr. HOARD: I know of no better feed than buckwheat middlings. They seem to pan out wonderfully in stimulating the milk-producing power of a cow. If I had any grain that would not make good feed for milk I would sell it and buy bran, if I could get it at a reasonable figure. Oats, buckwheat, corn and barley are in their way first-class foods. Barley is a close rival of corn. At the present price of barley it is which and tother which makes the cheapest and best feed. Where you cannot grow corn for feeding to milking cows in winter grow barley. Barley, oats and buckwheat middlings make a very fine ration. Apportioned thus, you can secure at least two pounds of protein to the average 1,000 lbs. cow giving twenty-five to thirty pounds of milk daily. You can get the amount of chemical matter in each of these grains from the feed tables, and balance accordingly. Of course, in the matter of oats, a value is returned in feeding that no table of analysis can show. We all say of a good horse that "it feels its oats."

Mr. BRESEE: What would you do with Longfellow corn that is well matured?

Mr. HOARD: You have a good ration in that. Feed about thirty or thirty-five pounds.

Mr. BRESEE: I am feeding forty pounds. My cows came in last January and are milking up to June.

Mr. HOARD: After your cow is three months in calf you cannot get the return from her for feed consumed that you did before she came to that point. You can get more out of a good farrow cow than you can from a cow three months in gestation, for in the latter case the process of gestation takes up the work of constructing the brain and nervous system of the fœtus—the calf. The moment that process sets in the finer

flavored oils of the milk are taken out. In order to have fine flavored butter you must have fresh cows coming in all the time. The percentage of fat will go higher, but it will be deficient in flavor, and will not make fine butter or prime cheese.

JAMES BISSELL: Is cheese make in winter as good as that made in summer?

Mr. HOARD: No; not unless you have fresh cows. I could make as fine cheese in winter as in summer if I could regulate the temperature. I believe it is a good thing to give your cows sixty days' rest before bringing her in. I had one cow, however, that I found it impossible to dry off until she dried off suddenly and died last fall. (Laughter.) Seriously, she died of an accident; the poor creature got her head broken. I called in the veterinary, but he could not save her. My man asked me if he would take off her skin. I said: "No; she has brought me over $300 in stock, and has paid me well in butter, and she is entitled to die and be buried in her own skin." (Laughter and applause.) That cow never had milk fever. She aborted for the first three years, and everybody said I would never do anything with that heifer; but she did well.

A MEMBER: Is abortion contagious?

Mr. HOARD: It is transferable, like tuberculosis; but it can hardly be described as contagious in the usual acceptance of that word.

Mr. JOHN COOK: My last two or three churnings have resulted in oil coming instead of butter. I churned last week for nearly two days and not a particle of butter formed. My wife saved the oil and said she would make short-cake of it. (Laughter.)

Mr. HOARD: How many gallons do you churn at a time?

Mr. COOK: Six or seven gallons of cream. The cows have been in milk from February until now. Every one of them is now in calf. They are what are called "strippers."

Mr. HOARD: I have come across this problem several times, and I may not be able to solve it, or tell you just why it is so. However, if you will scald the milk by heating it to 120° or even 140° and set it in the rest of your cream and ripen to a pretty good stage of acidity before you churn, you will, I think, get some help. The ripening is to be determined by the stage of acidity and the silky feel of it. I think such treatment will cause your butter to gather after a reasonable amount of churning.

Mr. HOWARD BISSELL: What effect would such milk have in a creamery?

Mr. HOARD: As a cow gets toward the stripper stage the butter globules become small, are difficult to get together, and are more likely to run into oil. When the cow is coming in fresh the butter globules are larger. If you heat the milk when it is in the stripper stage the heat appears to unite the butter globules together. It is more difficult to get the butter-fat to unite as the cows get towards the stripping period.

Mr. H. BISSELL: What is your practice about aborting cows?

Mr. HOARD: I separate the cow that has aborted from the other cows for about forty-eight days, unless they come sooner. I was in one place where the calf bleated like a lamb. That is a sign that the germ of the disease was present. This germ is found in the bowels of the calf and the placenta of the mother. Sometimes the calf will die after getting to be three days old. The calf is attacked by scouring, and the issue is of a reddish kind, something like that found in the bowels of the fœtus and the placenta of the cow. Of course abortion occurs from various causes. Sometimes from sheer weakness, owing to bad stabling, a cow may abort. I raised a bull calf that was illy developed. It was alive, but I had to hold it in my lap for two or three weeks while he sucked the cow. He came on nicely afterwards, and he made a good bull. I would advocate the isolation of affected cows.

A MEMBER: What do you think of land plaster?

Mr. HOARD: The use of land plaster is to be recommended. Forty per cent. of it is sulphuric acid, and that is one of the best disinfectants we have. We must look after the health of our animals.

A MEMBER: Would you advise the use of lime on manure?

Mr. HOARD: If you add lime to manure the effect will be disastrous. The lime will set the ammonia free. You have stepped into a horse stable and found the ammonia affect your nose. On the contrary land plaster retains the ammonia in the manure. I get my land plaster from Michigan. It costs me about $1.60, but I think it is worth $5 to me. A barrel will last eight cows about 200 days. I use a small handful night and morning for each cow, and I find it very beneficial, as it not only keeps the stable clean and sweet, but keeps the manure in the best condition.

Mr. BRESEE: If you have a fairly well built, well ventilated barn, with water and everything handy in it, is it a benefit to the cows to let them out in winter for exercise?

Mr. HOARD: The cow is a mother. You and I too often think that she is a steer. (Laughter). The cow is doing mother work, and if your wife is nursing she will not be too anxious to get into the cold. If she gets cold she knows that the baby will soon know it. Keep your barn clean and sweet, and keep her warm. Of course, if the day is fine, she may be let out.

Mr. BRESEE: Last winter I put my cows in the barn, and never let them out until April. My neighbors said the cows would not be good this summer, but they are good, and are doing well, and I am going to have them stay in again. My cows have no hair off knees like they used to have when I kept them out in winter.

Mr. HOARD: A friend of mine who is a Dutchman says that when he let his cows out his neighbors got the hair; but since he keeps them in he saves the hair for himself. (Laughter).

Mr. COOK: Those cows that give oily milk are fed on ensilage in the morning, and mangels fed with the root cutter, and during the course of the day I feed them good straw.

Mr. HOARD: Do you give them any other grain?

Mr. COOK: No.

Mr. HOARD: I understand now what is the matter with your cows. You are giving them too much carbonaceous food. You should not feed roots if you are feeding ensilage.

Mr. ELGIN ROW: I was in the same boat as Mr. Cook, and I stopped feeding ensilage. One day the boy churned for three and a half hours without avail. I then kept at it for another three hours and got some. We then took away the ensilage from the second row of cows. The next churning was done by myself. I was called away from the churning after a while, and I had the milk churned inside of half an hour. This winter I am feeding altogether differently from what I did before. I feed ensilage only once a day now. For afternoon feed we have ground oats in the straw. We cut cornstalks with the straw every other day, and give them after the cows are fed in the morning. I also give shorts.

Mr. HOARD: Do you think that the butter failed to come because of feeding ensilage?

Mr. ROW: Yes.

Mr. HOARD: That appears to be in the face of all the experiments at the Wisconsin Dairy Station.

Mr. ROW: Last year there was fault found with the milk and butter, but this year no fault has been found. I have concluded that I fed too much ensilage. I feed the ensilage after the cows are milked. The milk houses are about forty feet away from the stable.

Mr. HOARD: You say you could taste the ensilage in the butter. It is strange how experiences differ. We make butter for 3,000 families in Chicago. Of our 800 patrons between 200 and 300 have silos. There has never been the least fault found with the taste or smell of that butter. The greatest care should be taken to get the milk out of the barn just as soon as possible after milking. There is a certain ensilage flavor in the barn, and it is that which is sometimes found in milk, and not any flavor from the eating of ensilage.

## GRASSES.

By Dr. James Fletcher, Central Experimental Farm, Ottawa.

It has well been said that corn is the sheet anchor of American agriculture; but we do not want corn all the time, any more than a boy wants plum pudding all the time. We do not want "corn and nothing but corn." Some Canadian farmers are tempted to grow corn to the exclusion of all other grasses. Governor Hoard did not speak very favorably of timothy a few minutes ago, but I can tell you that timothy is not to be despised. It is still a pretty good grass to grow, for it can always be sold, and what can always be sold is not a bad article to raise. Every man must decide for his own district and his own land as to what is the best grass to grow in quantity

We have carried on at Ottawa extensive experiments with grasses and other fodder plants during a period of ten years. We have obtained from all available sources plants and seeds of all grasses advertised by seedsmen or mentioned by botanists. Before we go further it may be well to ask what is embraced by the term *Grass?* We find that under this term are included true grasses, such as timothy, the small grains and even Indian corn, which is a true grass; also the grassy plants like sedges and rushes, and in addition to these, clovers and many other fodder plants are frequently spoken of as grasses.

Where we can grow corn successfully of course we can always get a large supply of good rich food from the land—more, perhaps, than from any other plant now grown. There will always be discussion as to whether ensilage affects the flavor of milk; but I think Governor Hoard gave the key to the whole question when he said that it was probably the odor of the ensilage in the barn, and not the feeding of ensilage to the cows, tha influenced the flavor of the milk. We must exercise the greatest care in the handling o our products in every branch of farming. We know that certain plants, such as garlic, will taint milk; and we are all too familiar with the turnip flavor of milk. Careful experiments have been tried, which show that the proper feeding of ensilage does no harm to the flavor of milk.

Among the grasses grown on the Central Experimental Farm at Ottawa we have found many that ought to be more grown by the farmers of Canada. Clover and timothy are popular, because we know that if we do not feed that crop it can be readily sold for a fair price. Clover and timothy make good feed, no matter what may be said; but we do not want to give only one kind of food to cattle. However, clover and timothy as usually grown do not make a perfect mixture, even from a grass standpoint. The common red clover blossoms, we will say, about the third week of June, while timothy in the same district would flower in the first week of July. This means that the two plants do not mature at the same time, and that therefore the quality of the hay must be affected. Our experiments show that Mammoth Clover is a week or ten days later in maturing than the common red variety, and it therefore makes a better plant to mix with timothy, as both plants are at their state of greatest perfection at the same time.

Farmers in the matter of grasses are to a large measure dependent upon seedsmen. A seedsman is simply a business man, and there are some lines of goods which he can procure more easily than others; these may be tolerably good, and it is only natural he should try to use these. By taking a little more trouble, however, I think he may be able to get some lines that will be of more advantage to his patrons. Our seedsmen ought to have more of their seed grown in Canada under their own eyes so as to know that what they offer for sale is suitable for Canada, of good quality, and clean of the seeds of weeds. At present we have to go to Europe for our grass seeds These seeds come from various foreign countries, and are picked in many cases by children or others who cannot properly discern between similar but different varieties, and who are apt to be careless in selecting. We thus import much inferior seed and many foreign weeds. We should get only such seeds as are true to name. If they are not true to name, we

are not getting the worth of our money, and are running the risk of ruining our meadows. We should therefore encourage Canadian seedsmen to grow our seeds, and not import unsuitable sorts from Europe. I have grown imported grass seeds side by side with those of the same species ripened in Canada and have found our home grown seed preferable. There is no better clover or timothy to be found in the world than that grown in Canada.

Some years ago a great deal of clover and timothy seed was exported from Canada to the United States because the Americans recognized the fact that we could produce these seeds of the highest quality.

The attention which has been drawn to the subject of fodder grasses has had another good effect besides teaching what grasses are the best to grow, namely, showing some which it is wise not to grow. Ten years ago, when we began on grass experiments, nearly all the grass mixtures for permanent pastures offered for sale by seedsmen were made up from European catalogues, and the suitability of the varieties composing them was judged by the descriptions given in these catalogues without considering sufficiently whether the same results would be obtained under such widely different conditions as are found in England and France on the one hand and wide extending Canada with its many climates and greatly varying soils.

Perennial rye-grass so highly esteemed in most of the European countries from which catalogues could be obtained, naturally under the above named circumstances took a prominent place in all these mixtures offered to our farmers, and, as a consequence, permanent pasture mixtures soon got into disrepute, for this grass is not at all suitable for by far the larger proportion of the Provinces of Ontario and Quebec where most of these mixtures were sold. Besides this there are some grasses which ought to be much more grown in Canada, such as meadow fescue and orchard grass, both excellent kinds both for hay and pasture, and very suitable for mixing with clover or other grasses. Orchard grass I have recommended for mixing with clover, as it is ready to cut from the 18th to the 24th of June, which is the same time that the common real clover is also in its best condition. Therefore orchard grass and June clover are a better mixture than timothy and clover.

I have said that every man should decide according to his land as to which are the best varieties of grass for him to grow. On good rich land, of course, any variety of grass will succeed, but some kinds are particularly adapted to different locations, so that they can be classified roughly as grasses suitable for the different kinds of soil as for sand, clay, rocky pastures, high, low, damp, wet or dry

We have different kinds of land on the farm at Ottawa, some high and dry, and some very low and wet, and so we can find by experimenting what grasses are best suited for different conditions. We have now about two acres devoted to these grass experiments. If I see among the grasses being tried one that I think may make a good grass, I sow a square rod of it, and then if it is so good that it encourages further hope we put in a twentieth or a tenth of an acre. Our aim is to find out what kinds will best pay the farmer or dairyman to grow. I repeat, however, that where you can grow corn, corn should be raised to a very large extent, but you should not grow it to the exclusion of every other grass.

We have not only got grass seed from our own country and from Europe, but I have also sent to Australia and India for seed, and I am willing to send to any country in the world where I think there is any grass that we may grow satisfactorily. In my opinion the grasses we have sent to Australia have been of more value to them than those we have received from that continent. From India we got one grass, "Teff," which gave a heavy crop of excellent looking fodder, but of which the cattle were not fond.

There are some grasses largely grown in Europe which should be more extensively cultivated by us. I will only draw your special attention to meadow fescue with its variety the tall fescue. The first named has a finer straw, but both furnish abundant feed of the highest quality. They are excellent grasses for all parts of Canada, but require a rich soil to give the best results.

Orchard grass is much more permanent. It also gives best results in rich soils, but in poorer or drier soils it has also done fairly well. This grass recovers very quickly after cutting and in June will sometimes grow as many as three or four inches in a single night. It needs to be cut early to make good hay, for if it grows to long the cattle do not care for it. It is apt to grow in tufts, and it must be fed close. It is the favorite grass fed by Irishmen to their hunters, and this ought to be sufficent recommendation for it. If you sow the seed thickly enough it will produce a sward, but as usually sown in mixtures it grows in tufts. Although this character is frequently referred to it is not after all, much of a disadvantage beyond its appearance, which some, apparently, do not like.

Mr Hoard: A farmer in New York State, who does business on a large scale, has nearly his whole farm seeded down to orchard grass for his cattle and horses.

A Member: Would that grass be good for dry districts or in dry seasons like last summer?

Dr. Fletcher: Yes, better than many others; but for western Ontario last year a mixture of peas and one of the small grains would have been probably the best thing to sow. Prof. Robertson tried a series of experiments with mixtures of barley, oats, wheat and peas at the Central Experimental Farm, the results of which have been published, and may be had on application. Besides these true grasses there are a number of other plants which are advertised as fodders and which it will be well to consider. A great deal has been claimed for one which is practically worthless to us. I refer to a plant called Sacaline. It gets its name from the place of its origin, the island of Saghalien. Some have made the ridiculous assertion that this plant will yield 180 tons of fodder to the acre. (Laughter). It would need to grow about 100 feet high in order to yield that much; with us it grew about three. It is a harsh, rough food with woody stems, and we could not get our cattle to eat it. The island of Saghalien, where it comes from, is cool and wet in summer, and even there it grows along streams and in low ground, and yet it has been recommended by some for the North-west which is a dry region. On the 28th of June, we had a light frost at Ottawa, and this plant was noticeably injured by it so that it is also too tender for places liable to be visited by summer frosts.

I would next mention Wagner's wood pea, which grows luxuriantly with us, the flat green stems being covered with leaves and yielding plenty of seed. It is a very rich fodder, yet there are certain things about it which prevent my recommending it without qualification. It has been stated that it is poisonous. Now a plant may contain poison under certain conditions but not under others. Prof. Wagner claims to have eliminated the poisonous quality of this plant by cultivation, and so far it has not had any injurious effects upon our cattle. There was however a suspicion that it had proved poisonous in a case in British Columbia. The seed is very expensive as yet, but a good feature about this plant is that when once sown it is very persistent.

A Member: What about the wild pea?

Dr. Fletcher: There is nothing poisonous about any of our wild peas although some of them are hard to get out of land; all make excellent food for live stock. It sometimes happens that the same family of plants will contain both poisonous and harmless plants, which may resemble each other closely.

Prickly Comfrey is a plant which has been grown by some people for many years. It makes excellent feed for pigs and is also good for cattle, but stock have at first almost to be starved into taking it, though after this, it is said, they eat it greedily. There is a good deal of mucilaginous matter in it.

I wish now to draw your special attention to the Awnless Brome Grass. We introduced it in our first year's experimental work at Ottawa. It is a true grass, of large luxuriant growth. It produces an abundance of rich juicy stems, which make excellent hay, and also seeds freely. Some of our grasses, as the Canary Reed Grass, a native species, produce a large succulent growth, exceeding even in the beginning of June that of spring rye, yet, owing to their shyness in seed-bearing, they are not so popular or profitable as they might be. Shyness in seed-bearing is a drawback to certain

grasses which are otherwise most desirable. The Awnless Brome Grass has, unfortunately, several names, as Smooth Brome, Austrian Brome, Hungarian Fodder Plant. It is called awnless because unlike some members of the family the seeds have no bristle-like awns at the end. I believe this will be the one grass above all others for stocking the North-west and Manitoba. One of my correspondents who had tried it wrote to me from Virden, Manitoba, in 1891, and said that if the plant will do as well in the future as it has in the past, the question of grass growing in the North West was settled. A gentleman at Calgary has this year produced from 200 acres under irrigation no less than 900 tons of hay from this grass. The hay is of excellent quality, and even if left until the seed is ripe. When the seed has been threshed out of it the straw is more valuable than some hay which is cut nowadays, and which has been left standing uncut too long. This is because it throws out many barren stems which come up from the root but do not produce flowering stems, so that when the seed is ripe there are also many green grassy stems. This grass will not be useful for the North-west and Manitoba only, but also for many other parts of Canada. I think even Ontario farmers should sow Brome grass on the odd corners and rough pieces of land which occur on every farm. It will give some extra hay, and as it is a quick recovering grass after cutting you will have a good amount of feed off it in late summer. A question comes up, however, with this grass which must be considered. "Will it be easy to get rid of?" Brome grass throws out a large number of deep roots, but I think it will be got out by the same treatment that now *keeps in* quack grass. Some of you are afraid of quack grass, and I believe the chief reason of this is that it is generally treated wrongly. When a farmer, after looking at it for a long time, decides to get rid of quack grass out of his land he makes up his mind to do the work thoroughly and get right at it, and then goes at it with all his might, and plows it as deep as he possibly can. Without knowing it he actually helps the weed, and gives it just the treatment which helps it to become vigorous and spread. Now, gentlemen, if you want to get quack grass out of your land just plow as shallow as you can. The roots and underground stems of this grass only run down about four inches beneath the surface, and you should only plow just under it, say about five inches deep altogether. This will expose the roots to the air, and in an hour or so on a hot summer day they will all be killed.

Mr. HOARD: In 1853 my father sent me to summer fallow a six acre field to get rid of quack grass. I plowed it in shallow three times. I threw some of the roots on a fence. There came a rain storm next day and those roots began to grow again (Laughter). You must give them a little longer time than you said.

Dr. FLETCHER: Well, I said an hour or two. I will hedge to a day, but beyond that I won't back down one bit. (Laughter and applause.) Practically, quack grass has very little root. The underground stems usually taken for roots are made up of short joints, and are white, they are meant to stay underground so do not require any green color. They are juicy and full of sap. If you get them out of the ground and exposed to the summer sun and air they will soon dry up and die. The reason it is so hard to get rid of this plant is that if these underground stems are cut up, from each joint a new shoot will spring, so that deep plowing gives it what it requires, pruning and replanting. If the underground system of stems is thrown up on to the surface and you can get them dried up by keeping them out of the ground for an hour or two in the sun they will not grow again. Quack grass makes good feed and, as you will all agree, is very permanent. I have a plot of it at Ottawa, and find that after a few years it will choke itself out. The second year of the experience there was good hay produced at the rate of one and three-quarter tons to the acre. Since then in nine years it has gradually decreased until now we get only a few pounds.

Mr. HOARD: Does it hurt your horses' mouths?

Dr. FLETCHER: No, it is good hay. We have not found it injure our animals in any way. Before a grass can be called *good* it must be examined from four standpoints: 1. Is it hardy enough to stand the climate? 2. Can it be grown in paying quantities? 3. Is it a good nourishing fodder? 4. Is it palatable? *i.e.*, Will the cattle eat it? When testing

the feeding value of grasses we cut them and tie them in small bundles, and feed several at once to our cows, and find in this way what particular grass or grasses the animals like best. The food value of the different kinds is told by chemical analysis. Poor old timothy, so much discussed as a grass for horses but not for cows, appears to be especially popular with our cattle. A grass of great palatability to all classes of stock is "Wire grass," or Flat Stemmed Meadow grass, a small dark green grass with flat stems, which grows on limestone ridges. Wire grass does not grow over two feet in height, but is very heavy and will yield two tons per acre. It is often sold for lawn grass in this country, but it is not suited for that purpose because early in spring and late in autumn it turns reddish or purplish in color.

Of course an address on grasses would not be complete without a reference to Canadian June grass, which is often sold under the name of Kentucky Blue grass. The only difference in these grasses is the price of the seed, for if you buy it as Kentucky Blue grass you have to pay about double price for it. (Laughter.) This excellent grass is not valued as highly by Canadian farmers as it deserves. I think that it may be called the most valuable pasture grass in the world. It is relished by all classes of stock, and under repeated cropping produces more continuously than any other of our popular grasses. It is also the best known grass for lawns. There are other grasses worthy of recommendation, but time will not permit me to describe them at present.

Mr. Weir: I never give quack grass a chance to breathe through the leaves. I plow with a gang plow and a harrow. Shallow treatment fetches quack grass all right.

A Member: Is crimson clover good for permanent pasture?

Dr. Fletcher: No, it is an annual, and if sown late it is killed out as a rule, in the first winter in all parts of Ontario.

## ADDRESS OF WELCOME

Mayor Culbert of Brockville read the following at the evening meeting:

*To the Eastern Ontario Dairymen's Association:*

On behalf of the citizens of Brockville and of the surrounding country I bid you welcome to our midst for your twentieth annual convention.

The dairy industry is a most important one for all of us, and every business man in town and farmer in the country is vitally interested in its success.

We realize that meetings, such as you are now holding, are of great advantage to all who attend and that both instruction and enjoyment are derived from them.

We are pleased that both our Dominion and Provincial governments are alive to the importance of fostering the dairy interests of the country, and we are glad to have both governments so ably represented here.

Every practical man must be benefited by listening to the addresses and discussion outlined in your very interesting programme, and we are sure that many of those who are only indirectly interested will gladly avail themselves of the opportunity to learn more of what the leaders in this great branch of our national prosperity are doing.

The citizens of Brockville are pleased to have so many representative men in their midst, and trust that you will all have a pleasant and profitable visit to our good town.

Wishing your Association every prosperity, and the dairy and kindred industries every success, I once more bid you welcome.

Mr. Henry Wade, President of the Association, in reply, said that there had been five dairy conventions held in Brockville, and the members of the Association had always felt that the town had dealt hospitably and generously with them. He thanked the mayor and people of Brockville for their kind words.

## HOUSE PLANTS AND WINDOW GARDENING.

Dr. FLETCHER, Dominion Botanist, then gave an interesting and instructive address upon "House Plants." He pointed out that the cultivation of flowers played an important part in the happiness of wives and daughters. He lauded the good old scarlet geranium, and then gave valuable hints regarding the culture of calla lilies, carnations, roses, fuschias and other flowers suitable for window gardening.

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## AGRICULTURAL UNITY AND PROGRESS.

BY HON. JOHN DRYDEN, MINISTER OF AGRICULTURE FOR ONTARIO.

The hon. gentleman was next introduced and was enthusiastically received. He said: I am always pleased to do anything that will give encouragement, strength and enthusiasm to any branch of agriculture. I am especially pleased to be present at this meeting of the Eastern Dairymen's Association. I am glad that I am permitted to stand upon this platform in company with such eminent men as are here gathered. These come from different stations in life, and from different States and Provinces, but all are united in their effort to benefit humanity.

Dr. Fletcher in his address this evening upon flowers has suggested several things which should add to the pleasure and happiness of those living in rural districts When I was much younger than I am now, I used to be told that practically the whole world was divided into what might be called two heaps, one expressing misery, wretchedness and difficulty, and the other expressive of pleasure and happiness, the latter being much the smaller. I was taught that in later years it would be my privilege day by day to lift something from the larger heap of misery and add it to the heap of happiness. I have found since then that this was true advice, and that it is quite possible to accomplish considerable in this direction.

If this be true, then to furnish food products that are pure and contain health-giving qualities and are pleasant to the taste must be adding to the health and happiness of our common humanity. To help the struggling farmer, doing his best under in many cases difficult circumstances—working as he does day in and day out—by conveying to him such information as will add to his skill and to the quantity and quality of his products, and hence to his prosperity, so lifting him and his family to a higher plane, is also adding to the heap of happiness.

This is the work in which these gentlemen are engaged from year to year. I am glad on this occasion to be permitted to join them. True it is that I do not come bringing special information in reference to any of the dairy topics to be discussed at this convention, but as the medium through which the motive power which impels the work of this Association is obtained, I come to bring greeting, to give encouragement and to express my good will.

The old race-course saying declares that after all "It is money that makes the mare go." If that be true, it is also true that money makes a dairy association go. But money would be of little use without proper organization, affording suitable channels through which it may flow; and may I say that the organization however good would be entirely helpless without the money. You, Mr. Chairman, in conjunction with your colleagues, have provided the organization necessary—intelligent, energetic, alert, patriotic. The Legislature has been good enough to furnish the money, and the two thus joined have made a strong team, which has materially helped our country over the difficult days through which we have been passing. I come on this occasion to bid you go forward. I want you to hold every inch of the ground you have secured, and, whenever it is possible, to make an advance; and as to the Legislative end I should like to say, *as* it has been in the past, *so* shall it be in the future, and *more so* if it should be found necessary.

This Association, as well as the other dairy associations of the Province, has during recent years (whether cognizant of it or not) been making history for this country. The future historian when he comes to speak of the industrial progress of our Province, cannot fail to mention the good work that has been performed by the various dairy associations. He will naturally speak of the progress made in connection with the cheese industry. Then, later, the work of developing the butter industry began, being fostered by another of our dairy associations. Through these organizations great advancement has been made. Much of the work that has been required of the members of this Association has been of an entirely unselfish character. Sometimes work of this kind while patriotic in its nature combines self-interest; but in many cases this is not true; it has not only been unselfish, but it has been incessant, continuous, and, as I said before, patriotic.

Coming on the train this morning, and looking over the morning paper, I read what purported to be a patriotic appeal to various persons scattered throughout the length and breadth of this Province. As I read the appeal I said to myself, "No, this is not the appeal of a patriot, it is the appeal of a demagogue, a hypocrite and a deceiver." There are other so-called patriots who, with selfish design are constantly preaching upon the housetops what I can designate by no other term than mock loyalty. The man who, shouldering his musket, takes his life in his hands and goes out in defence of his country is called a patriot, and rightly so; and if he returns victorious, we make of him a hero. The man who goes abroad and returns a victorious rower we also designate in the same way; and so he who takes a Canadian boat and wins a race is applauded also; but what shall we say of those men and women scattered all over this fair Province who by persevering industry, skill and thrift, have succeeded in winning for us the *industrial battle* of the nations, and who to-day hold, so far as many of our products are concerned, the championships of the world? These are the true patriots; these are the men who deserve special mention and special honor. We believe that our loyalty is best shown, not by mouthing sentiment, especially when it is intended only to separate our people and destroy our nation, but rather to that course which tends to the building up, giving strength and stability to our interests by adding wealth to our people. He is the man truly loyal who undertakes in whatever sphere he works to do his part well.

The year 1897 is to be a specially historical year. I hope that we shall see during this year a greater unification of our dairy forces, a cementing together of those interests which have everything in common and which just now need the enthusiastic and united efforts of all our people. I hope that this work will be so well done that we shall not hear of the east and the west, the north and the south—that we shall not hear such a special mention of Ingersoll, London, Kingston and Brockville, in reference to our dairy industries, but that the word "Ontario" will always be heard from every quarter. And when our brethren down by the sea and in the Great West are prepared to join us in the fight, then I hope to see Ontario merged in that greater name, "Canada."

Then the year 1897 is to be a historical year because we are to see the announcement of better transportation facilities. We have heard much about this in the past; it was sometimes said that it had been accomplished, but up to this moment it has not been accomplished. Something may have been done, but the complete equipment has never yet been furnished. To-day, however, the dairymen, fruit growers and stockmen, have found a new friend in the person of Hon. Mr. Fisher, the present Dominion Minister of Agriculture. He is coming forward boldly and declaring his determination and willingness to give help in this direction. He proposes to help you to place your products on the market in better condition. But I want to point out that he will not have gone far in this work before he will be crying to you for help. He can do nothing without your hearty co-operation. He will demand of you a good article; he will not want a good

article spasmodically, but a good article all the time ; he will want it furnished in steady and definite quantities ; he will want it of such a character as to please and suit the particular market to which it is sent. I want, therefore, when that time comes, that the dairymen should be in readiness, united and harmonious, to furnish the advice and help that may be necessary. I hope they will also have courage to demand that these additional privileges shall not be furnished to men who refuse to do anything towards improving the quality of the articles they are sending. There is no excuse in these days for the man who says he does not know how to do better. We are furnishing light continually ; we are thrusting information upon everybody, and the man who, in the midst of this light, loves to walk in darkness, ought to be left to enjoy his darkness alone. The Government, in my judgment, ought to say, we are willing to help the man who is willing to help himself. We can never attain the reputation to which we are entitled unless there be a unity of effort in furnishing the very best article possible.

There are those who tell us in these days that no more can be done in the matter of dairy production—that we have discovered all there is to be learnt, and that no further advancement can be made. I want to say that there is no greater mistake than a statement of that kind. If it be true that eternal vigilance is the price of liberty, it is equally true that eternal vigilance is the price that must be paid for superior dairy production. As an illustration let me mention a case, which I presume will be discussed at this Convention, and which serves to illustrate this point : In one of the eastern portions of this Province great trouble was experienced for a considerable time, because of the presence of a reddish-brown streak found throughout the cheese. It was of such a character as to interfere materially with the sale of the cheese. Efforts were made to discover the cause. The attention of several who it was supposed might be able to furnish light was drawn to this matter without success, until the bacteriologist of Queen's University, Dr. Connell, was asked to investigate it. He went to the factories where the difficulty was being experienced, taking samples of the milk, rennet, salt, coloring, etc., and in his investigations he found, speaking in common language and not technically, a vigorous colony working in one of the gutters leading from the cheese room to the whey tank. This was carefully fostered, and used in the manufacture of cheese at Kingston, and was found to inoculate the cheese and work out similar results. What was his remedy ? His remedy simply was greater cleanliness about the factory, suggesting that new gutters should replace the old ones, and that the whole place should be disinfected and thoroughly cleaned. This was done and no further trouble, I understand, was experienced. Here then, was a new difficulty that had never been surmounted. It had occurred before, but had passed away probably for the same reason that it has in this case. But the cheesemaker knows that these new difficulties are constantly cropping up, and that we have not yet, nor will we probably ever arrive at that stage when we shall be able to say there is nothing more to be learned or found out.

We shall all agree that we *can* produce a superior article : I think our record in the past has proved this. What I should like is that we should therefore all agree that we *will* produce a superior article. In order to do this we must not only keep up but make more perfect our organization ; we must continue steadfastly our education and we must have harmonious action. My heartiest sympathy goes out and shall always be given to the toilers of our country. In the city of Brockville and in all our cities we have labor unions which have accomplished much for the good of those for whom they were created ; but who will speak for those in the fields and the farm homes of our land ? Too much isolated for any union worthy of the name, and yet there are none in all our land who are more truly entitled to the name laborers, working as they do patiently day in and day out, sometimes with very meagre returns, receiving for their labor only board, clothes and lodgings and none the best at that, yet always laboring in hope of something better, studying, it may be during the long evenings, the information which this Association sends if by any means they may find something that is better—some new and improved methods, some greater economy, something that will add to their skill. These deserve every encouragement at our hands. They deserve all the help we can bring. After all they are at the foundation of our success and prosperity. You must, Mr. Chairman,

carry the "gospel"—the good news of better methods, of superior quality—to these people. In the past this Association has done much of this work, and has been used by my Department towards that end. I want you to continue the good work, and so long as you are found doing so, you will find in me an enthusiastic friend and supporter. (Applause.)

## A VOICE FROM WISCONSIN.

Ex-Governor Hoard was warmly received and for ten or fifteen minutes amused and interested the audience. His humorous stories, each with a timely moral, were loudly applauded. He drew an analogy between courting and dairying. The more a fellow loved a girl the more he was likely to think of himself; and the more one was taken up with dairying the better and more useful citizen he was likely to be. He was free to admit, however, that too often the analogy was very close in the fact that both occupations were more charming in the contemplation than in the round-up. Both marriage and dairying were based on one of the deepest principles of our common human nature, viz, motherhood, to which every true man of principle takes off his hat. In all farming to-day, but more particularly in dairying, there was a need of more intellectuality. Work should be clearly planned; it should be first thought out by the brain before being wrought out by the hands. Special direction should be given every expenditure of force. The powerful ore crushers at the mines were run at great expense, and at an apparent waste of energy; for they were grinding great lumps of rock that nobody wanted in order to get at little grains of gold that everybody desired. And if there was enough gold there it paid to crush a lot of otherwise worthless rock. And so the gold of truth—moral, scientific and economic—must be got by stripping it of much of the extraneous error. That was why dairy and other conventions were held, to get at the truth, little by little, and accumulate valuable facts for all who wished to learn. After a pleasant allusion to his visits to Canada, and a humorous story about the Populists, he resumed his seat.

## THE NATION'S BREAD AND BUTTER.

Prof. Robertson, Dominion Agriculturist and Dairy Commissioner, then delivered an address upon the above named subject. A report of this speech appears in the Western Dairymen's Report.

## CHEDDAR CHEESEMAKING.

By J. A. Ruddick, Superintendent of the Kingston Dairy School.

What constitutes a Cheddar cheese, and why is it so called? These are questions frequently asked, and not always correctly answered.

As far as my information goes this particular kind of cheese takes its name from the village of Cheddar, in the county of Somerset, England. It is said to have been made there for as much as two hundred and fifty years past. Prof. Sheldon, writing on the subject, says that "Cheddar cheese resembles the British people in so far as it is cosmopolitan alike in its presence and its adaptability." Certainly no other kind of cheese is made in so many countries and to such an extent as it is. It well deserves the title "King of Cheese."

It is made in various parts of England and Scotland, in Australia and New Zealand, in Canada and United States, and even in Germany and Russia.

Some of the English makers do not admit that ours is a true Cheddar, but I cannot see any essential difference in the process as followed in either country. The one feature which distinguished the process of Cheddar cheese

making from that of the hundred or so other varieties of cheese is the direct and intentional employment of acidity before the whey is removed. All the other important kinds of cheese are made from sweet curd. The principles underlying the making of Cheddar cheese are better defined and more thoroughly understood scientifically than those of any other kind.

Canadians are not behind in this respect; in fact I believe that as a whole our makers are the best trained and best educated in the world. Certainly we have reached a point where we are able to produce cheese of remarkable uniformity over a very wide range of country; for it is a fact that you might make a collection of cheese from every Province in this broad Dominion, from Prince Edward Island to British Columbia, and find them so uniform in style, appearance and quality that they could be sold as one lot. No better proof is needed to show that our makers are working intelligently and along well defined lines. We have here also evidence of the value of the work of instruction in which Canadians were pioneers, and have ever since been a model for other countries.

But my subject is the "Process of Cheddar Cheesemaking," and I must confine myself to that. It is not my purpose to deal with the whole process in detail, but rather to take up a few important features and discuss them separately.

## Fermentation Starters.

First then let us consider the use of fermentation starters. The use of a "starter" in cheese-making is not a new thing, for years ago it was a common practice to use sour whey to hasten the ripening of the milk, and milk was even held over for the same purpose. This milk was usually taken from the vat after the temperature had been raised to the setting point, but careful makers soon found out that although the development of acidity was hurried it was usually accompanied by injurious flavours, and the practice was condemned. Since that time, however, we have learned how to use the "starter" intelligently, with beneficial results. It will not do to take milk for a starter simply because it is sour, but due regard must be paid to the flavour as well; and in order to have it right great care must be exercised in preparing it. There are several ways of preparing a starter. In the first place there is the "pure culture of lactic ferment," so called, which may be procured from any dealer in dairy supplies. To use this a quantity of milk or skimmed milk is pasteurized, that is, heated to 158° Fah., and then cooled to about 80°, after which the pure culture is added, and the whole then protected in a tightly closed vessel. Another plan is to use any good sour milk in place of the pure culture for adding to the pasteurized milk, keeping over each day a small quantity for that purpose, as long as the flavour remains good. A third plan is to select every day some of the very best milk which comes to the factory, warm it to 80° or 90° and then allow it to sour spontaneously. The latter plan is much the simplest and will, I believe, give the best results in practice. It is necessary that great care should be exercised in selecting the milk, taking nothing but what is perfectly clean in flavor, and then protecting it from contamination by keeping it in a thoroughly clean and air-tight vessel. After the milk has turned sour, but before it is thick, about 50 per cent. of pure cold water may be added, which will prevent it from becoming too thick and cheesy. If coloured cheese are being made, the starter should be coloured before it turns sour. From 2 to 5 per cent. of this may be used, according to the needs of the case.

The primary use of a starter is to hasten the ripening of the milk, or in other words, aid in the development of acidity. Judiciously used it has a good effect also in overcoming the bad effects of tainted or gassy milk.

It is well to remember in this connection that when milk is cold, say below 60°, the bacteria which it contains do not multiply rapidly, and are in a more or less dormant condition. It even takes some time for them to revive after the temperature is raised. In order then to derive full benefit from the use of a starter it should be held at a

temperature of 80° or 90° for about an hour before using, thus giving the organisms time to become vigorous and quick in their action. Every cheese-maker present must have noticed in ripening milk that the changes at first after heating take place slowly, but when the milk stands some time the development is much more rapid.

### The Use of Rennet.

Our next point for consideration is the use of rennet. Rennet is the only known agent which is suitable for the coagulation of milk in cheese-making. It forms a tough, elastic curd, and helps to expel the moisture. When milk is coagulated by the addition of acids, the curd is soft and flocculent, and does not hold the fat the same as rennet curd does. The strong acid reaction is not favorable to the growth of the particular kinds of organisms which are instrumental in curing the cheese, while the rennet curd presents a condition which is very favorable.

It is now admitted that rennet has nothing to do directly with the curing of the cheese. The French and German investigators, to whom we are indebted for almost all our knowledge of this subject, do not recognize rennet as a curing agent at all, but attribute the changes which occur during the ripening process to the action of bacteria. But, you say, how do we account for the fact observed by all makers, and taught everywhere, that the more rennet one uses the quicker will the cheese cure? Generally speaking, it is true that a cheese made with a large quantity of rennet cures or ripens earlier than one made with a smaller quantity, but it is not necessarily so. I think the explanation is as follows: If a large quantity of rennet is used, the curd formed is firmer and tougher on that account, and is not broken up as much in cutting and stirring during the early stages, and as a consequence it contains more moisture, and it is this moisture which causes the cheese to cure quicker by making the conditions more favorable for bacterial development. The difference in amount of moisture may be slight, but it only takes a slight difference to affect the curing.

The effect of temperature on the action of rennet is very interesting. At 60° Fah. the curd formed is very loose and flocculent, and below that point there is very little action. Experience teaches that the freezing of the rennet extract weakens it somewhat but does not destroy it. Between 80° and 105° the curd is more or less firm, reaching the maximum at the latter point. As the temperature is raised above 105° the power of the rennet is gradually diminished. At 122° the curd is again soft and spongy, while at 140° the rennet becomes permanently inactive, subsequent cooling having no effect in restoring it to a normal condition. Thus we have additional proof that rennet is not the active agent in the cheese-ripening process, because we know that the famous Gruyère cheese is "cooked" to a temperature of 135°—a temperature high enough to destroy the action of rennet—yet this cheese cures naturally.

The practical lesson which we may draw from the foregoing facts in relation to temperatures is that it is always best to use cold water for diluting the rennet extract before adding it to the milk. The low temperature delays the action of the rennet for a few seconds, giving time to stir it into the milk. Never use warm water.

Before we leave this matter of the use of rennet, I wish to say that I hope no one will think that I would consider the quantity of rennet used to be unimportant. There is a medium in all things. If we use too small a quantity of rennet, or set at too low a temperature, the curd is tender, it is easily broken, and there is an unnecessary loss of milk constituents. We are using too large a quantity when the curd forms quickly and becomes so firm that we cannot cut it properly. If for no other reason, it is a waste of material to use too much. I would say that, under ordinary circumstances, enough rennet should be used to make the curd fit for cutting in not more than thirty minutes.

### Cutting the Curd.

This is one of the most important parts of the process. A knowledge of the proper condition for cutting can be acquired only by actual observation and experience. If it is cut too soft there is too much loss because the curd is easily broken; while on the other

hand if it is allowed to stand too long it becomes tough and hard to cut evenly. Whenever the cutting has been started it should be finished without delay unless it is found that it has been started rather too soon. I know from observation that many makers are careless about the cutting, doing it in a very rough manner, smashing and bruising the curd with their knives. The cutting should always be very carefully done and every effort made to cut the curd as uniform in size as possible Never use a knife from which there are any blades missing any longer than can be helped. Remember that if you have a curd made up of uneven sized particles, you have at the same time one in which all the parts are not changing alike ; for it is well known that a coarse curd will change much more rapidly than a finer one, for the simple reason that the coarse particles contain the most moisture. We make use of this knowledge in handling over-ripe milk by cutting the curd very much finer and stirring it harder during the early stages ; in fact it is of the utmost importance to do so.

In connection with the cutting of the curd, let me point out something which I have noticed in going from one factory to another—something which has quite an important bearing on the working of curds.

I refer to the curd knives and the differences which there are in the knives at different factories. We find that at one factory the knives are so made that the blades are a full half inch apart, some are even more than that ; while in other factories the blades in the knives are only three-eighths of an inch apart. Now this seems a small matter, but I am satisfied that the same thing has been the means of causing a good many inferior cheese to be made ; not necessarily of course, but because makers when changing from one factory to another have not fully understood the different effects of cutting the curd thus coarse or fine, or else have not been observant enough to notice that there is a difference in the knives. We often hear makers say that the milk works either faster or slower in one particular factory than it does in some other that they have worked in, and the difference is generally attributed to locality, but I think it might very often be traced to the causes I have enumerated.

I am not prepared to say that the milk does not work differently in different sections of the country. There may be more in that theory than we are aware of. The English makers lay considerable stress on the point, and they claim that where there is abundance of lime present in the soil it is not necessary to heat the curd as high as in other places where the soil is deficient in lime. But then they used to think that good Cheddar cheese could not be made outside of the county of Somerset, and we know how mistaken they were on this point. I think, however, that the question of the effect of soils upon cheese-making is one which is worth investigating. In my own experience making cheese over a very wide range of country, I have noticed some differences which might be due to the influence of soils. For instance, last summer, when I made cheese one day high up in the mountains of British Columbia where the soil has been formed by the disintegration of those mighty masses of limestone that compose the Rocky Mountains in that locality, I found that a temperature of 98° gave me a very hard, firm cheese.

I am told by those making cheese in Prince Edward Island that the tendency is the other way, and geology shows us that the soil there is what is known as the triassic formation and is deficient in lime. In Ontario we have such a variety of soils usually within the territory served by any one factory that these effects are not likely to be noticed readily.

### The Cooking of the Curd.

Passing on to the heating or the "cooking of the curd," as it is called, I wish to draw attention only to one point, viz.: the variation in temperature required for milks containing different percentages of fat. We find that when the milk is comparatively rich in fat, say over 4 0 per cent., rather better results are arrived at by raising the temperature of the curd as high as 100°. It helps to make the curd firm and lessens the tendency towards "pastiness."

### The Care of Cheese in the Curing Room.

I will conclude this paper with a few suggestions relative to the care of cheese in the curing room.

Makers are sometimes bothered by their cheese moulding. This is a sure sign of too much moisture in the atmosphere. Cheese usually mould a little in a new curing room on account of the moisture in the new lumber. Good ventilation and plenty of light will help to keep down the mould, and when it is necessary a quantity of stone lime placed in the room will absorb a great deal of moisture. Mould will not hurt the cheese except in appearance, unless there are cracks or broken surfaces where it can penetrate. On the other hand cheese frequently crack, not only on the ends but in extreme cases under the bandage as well. This cracking of the cheese indicates that the air in the room is too dry, the cheese are cracking simply because they are losing too much moisture, just like a piece of green timber will check and crack if dried out too quickly. Some batches of cheese develop cracks quicker than others because they are naturally drier. Sour press boards and cap cloths also have a tendency to cause the ends of cheese to crack. Moisture may be added to the air in a room and the temperature lowered several degrees at the same time by sprinkling water on the floor. Another plan is to suspend a sheet of canvas in the room and keep it saturated with water until the desired amount of moisture is secured. In Australia this plan has been adopted, and by placing the canvas in the window it is claimed that the temperature may be reduced as much as ten degrees. I fancy there would not be as much effect in this country because it is not as warm or as dry here as it is in Australia, consequently there would not be the same amount of evaporation. Our cheese suffer a great loss in weight as well as injury in quality on account of the high temperature to which they are subjected in poorly constructed curing rooms during the hot weather. Thousands of dollars are lost annually, all of which might be saved by a little improvement in buildings. I am satisfied that every dollar spent in improving many of our curing rooms would be saved in one or two seasons at the most. Suppose, for example, that we have a curing room with an average of 300 cheese in it. If we can save a shrinkage of half a pound per cheese per week, it would amount to 1,800 lbs. of cheese in twelve weeks, and this at 8 cents per lb. is worth $144. I believe it is quite possible to effect this saving in a majority of the factories by fitting up the curing rooms so that the temperature can be better controlled. Besides the saving in shrinkage, we must also take into account that the quality of the cheese will be better preserved, and cheese-makers will not be called upon so often to pay reclamations.

### Red Discoloration in Cheese.

This matter of red discoloration in cheese, referred to last night by Hon. Mr. Dryden has attracted a good deal of attention for several years past. I do not intend to go into the matter in detail, because a bulletin will be published shortly by the Agricultural and Dairy Commissioner, giving a full history of the trouble with the different investigations which have been carried on with a view of determining the nature of the disease and if possible suggest a remedy.

I merely want to refer to an investigation which was made by Dr. Connell, Professor of Pathology and Bacteriology at Queen's University, and Lecturer on Bacteriology at the Kingston Dairy School, during the past summer, and see if we can draw some lessons from it.

About the latter part of May last, the maker at a factory in this county wrote to the Dairy Commissioner complaining that his cheese were being affected by this discoloration, and asking for help to get rid of it. Dr. Connell was asked to undertake an investigation. He went to the factory made a careful examination of the surroundings and interior of the place, took samples of the milk, the cheese which was affected and materials used in making the cheese. He also secured samples from the slime in the gutters and spouts leading from the vats to the whey tank.

In a short time he succeeded in isolating from the cheese and *from the gutter slime* the particular organism which produced the reddish yellow pigment in the cheese. The organism was kept growing all summer in the laboratory and on Dec. 1st this cheese which I have here was made at the Dairy School and inoculated with the organism after the curd was cut but still in the whey. In a few days the red spots appeared in the cheese and the bacillus has since been recovered from it.

That this trouble is of bacterial origin there can be no doubt. That the particular bacterium causing the trouble found a lodging place and flourished in and around the factory where more or less filth accumulated, and from there seeded the curds in the vats is also quite sure, and will be proven by the full report of Dr. Connell.

The lesson which I wish to point out from these facts is that if this particular organism which produced this color can flourish under such conditions, may not others which produce bad flavor do likewise. There is every reason to believe that they do, and I hope the result of this investigation will give emphasis to the importance of keeping our factories cleaner and exercising greater care in the handling of milk and its products. There is a lesson for us here if we will only learn it.

Mr. A. A. AYRE: These reddish spots in cheese are known among the trade as "rust." Sometimes it is not very noticeable; at other times it is so apparent that it is quite speckled. In one particular case we were puzzled, because it was a new factory, and there was a mountain stream running by the factory and everything seemed to be all right. Of course there may have been something about the factory which we did not observe which gave a home for this germ. However, it is clearly evident that even in new factories there is danger from these red spots. They had this trouble in an old factory across the St. Lawrence, in New York State, and they burned it down; but the old trouble occurred in the new factory. This bacteria appears to have its growth in certain sections of the country, and it appears to be as difficult to get rid of as quack grass. We get cheese sometimes in which it is scarcely apparent at the time of delivery, but by the time it gets to the other side of the water it has developed so that it is very apparent, and so does us injury. I am glad the professor at Queen's has detected this germ, and I hope we will get further information regarding it. Mr. Ruddick has talked about heat in the curing room. I would like to get the maximum and minimum temperature for the curing room. He also said that mould does not hurt the quality of cheese. I would not like you to go away with the idea that it does not hurt the sale of the cheese, for it does. There are many things in this world that may not hurt the inside, but look bad on the outside.

Mr. RUDDICK: I think that any temperature which causes the fat to run out of the cheese is too high, and is certain to result in injury. Some cheese act differently in the same temperature. A certain cheese will begin to exude fat at 80°, while another will stand a higher temperature. The right temperature for a curing room is from 60° to 70°. If it goes below that the cheese is apt to develop a rather bitter flavor, and if above that range it will likely develop an impure flavor. Some temperatures are favorable to the development of certain organisms, and from 60° to 70° is likely to develop good flavors. High temperatures are calculated to bring on what are termed filthy flavors. Five degrees in a curing room makes a great difference.

Mr. AYRE: How many curing rooms are there in the country that can manage to keep the temperature below 85° in hot weather?

Mr. RUDDICK: There are many.

Mr. SHELDON: Is this red spot caused by the milk, by the grass, or by the incapability of the man?

Mr. RUDDICK: I do not think you should blame any of the three. It should be charged to bad surroundings.

Mr. D. M. MACPHERSON, M.P.P.: These red spots in cheese have been the cause of a good deal of loss to the country. This discovery of Prof. Connell's is an important one, and goes to show that we are learning every year things pertaining to the welfare of this

great cheese industry. I do not think that the factories alone are to blame for the presence of this bacteria. I believe that in many dairies the milk is not kept in a proper place and becomes inoculated with this bacteria. I had several factories which were affected by this red spot, but it disappeared and has not come back. I think this is because patrons have taken pains to remove the cause. I think that the welfare of the cheese industry is largely in the hands of the men who supply the milk. I was glad to hear the remarks of Mr. Ruddick in regard to the quality of our Cheddar cheese. I believe that if any country in the world is to-day producing real Cheddar cheese it is Canada. I met Mr. Lister a few days ago in Montreal, and he confessed that if he wanted to secure a uniform and fine Cheddar cheese he had to come to the Canadian make. (Loud applause.) That goes to show that if quantity, quality and uniformity are the marks of success in the cheese industry, then Canada has the highest place of any nation, and that the Canadians have thoroughly mastered the principles of good cheese-making and have put them into practice. This should stimulate us to go on and still further improve, and not only maintain our present lead, but reach higher achievements than in the past. The Kingston Dairy School is one of the best things we have had to encourage this great cheese industry in this eastern section. A few years ago some of the poorest cheese in the country was made near Kingston, while to-day some of the best cheese in Canada is being made in that section of the country.

Mr. Howard Bissell : We ought to be a happy and proud people, for we have the finest cheese-makers, the finest cheese and the finest cheese buyers in the world ; but we have also some of the most stinking cheese made anywhere. Our good cheese is injured by the reputation of this bad flavored stuff. We must find out where this bad odor comes from. If patrons could only be got together to talk the matter over as we are talking it over to-day there is no doubt that they would find it a great benefit. There are too many men who are sitting around their fires or the grocery fires who should be at dairy meetings. Such men are now feeding straw to their cows, and will have to "tail" them in the spring. Perhaps Mr. Ruddick will give us the cause of this stinking cheese.

Mr. Ruddick : I cannot answer that question satisfactorily in a few words. Various causes affect the flavor of milk, such as food, the length of time a cow is in milk ; and bacteria of different kinds also affect the flavor, although sometimes for the better. But these stinking flavors are due entirely to the wrong sort of bacteria. What are bacteria ? They are simply tiny forms of plant life. They may be divided into good and bad kinds, just as plants growing in the fields are divided into flowers, grains and weeds. These vile flavors are due to the fouler bacteria. Prof. Connell has shown us these cultures in the Dairy School. He has reproduced certain bacteria from specimens or samples sent him. In winter time bad flavors come from the stables—largely from contamination of the milk by the droppings of the animals.

Mr. Hoard : Ninety-nine cows out of a hundred are plastered from one end to another.

Mr. Ruddick : This filthy stuff drops into the milk, and milk is one of the most suitable places for growth of these organisms. It is Prof. Connell's idea that bacteria of vile flavors originate in the dairy, and that they may grow or develop in the utensils. If milk utensils are not thoroughly scalded there is a danger of the factory suffering loss.

Mr. Franklin : Are curing rooms as a rule properly constructed with regard to ventilation, temperature, moisture, etc.? How should they be built ?

Mr. Ruddick : That is a big question. No curing room is properly constructed in which the temperature cannot be easily regulated. The walls should be non-conducting, and good ventilation should be ensured.

Mr. J. A. Kerr : Is it true that we are likely to lose more fat from Saturday night's and Sunday morning's milk than from milk at other times ?

Mr. Ruddick : I do not know that that is a fact. It has not happened so in my experience. If it does occur it is simply because the milk has not been properly handled.

A MEMBER: How do you handle gassy milk?

Mr. RUDDICK: You must protect the milk from contamination. There are one or two ways in which milk can be contaminated which have been overlooked to a considerable extent. You know that road dust contains a great deal of bacteria. Too often milk cans are not properly covered, and driving in dry weather fills the air with dust and germs which fall into the milk cans. The dirt found in the bottom of milk cans generally comes from that source. Millions of bacteria may thus be conveyed to cheese factories. Milk cans should be very carefully covered. Regarding gassy milk, I suppose the person asking the question means "pin-hole curd." In such a case I would handle the curd until these holes are flattened out—until the bacteria causing the pin-holes are overcome by other bacteria. However, you cannot make good cheese out of such milk; there will be a loss in the curd.

A MEMBER: Are these bacteria referred to injurious to human beings?

Mr. RUDDICK: Dr. Connell says he has not yet decided that point.

Mr. AYRE: We have found that in some cases the eating of the affected cheese made people sick and caused vomitting. With other varieties of spotted cheese, however, this has not occurred.

Mr. A. HENDERSON: Do you not think that whey tanks need covering?

Mr. RUDDICK: I think the whey tank is all the better for being covered, because it thus is kept cooler, and the whey is not so likely to spoil. Our whey tanks are elevated, so that they can be cleaned out more easily and more frequently.

Mr. RANSOM: Can you give any explanation why milk will become thick and yet remain sweet?

Mr. RUDDICK: That can be explained by certain organisms, which have a rennet-producing effect being developed, and thus thickening the milk. The only remedy I suggest is to take extra pains to disinfect, by having every utensil that the milk comes in contact with washed in scalding water, and also have the udders of the cows thoroughly cleaned, and so get rid of the odors of the grease. No disinfectant is so destructive to bacteria of this sort as direct sunlight.

Mr. HENDERSON: Has thunder anything to do with the souring of milk?

Mr. RUDDICK: No; but the conditions which produce thunder also affect milk in the way suggested.

Mr. FITZGERALD: We sometimes have difficulty in getting out milk to thicken evenly in the vat after applying the rennet. One end will be all right, but the other end will not be the same.

Mr. RUDDICK: It appears to me that there can be only one answer to that, and that is that the milk has not been thoroughly stirred.

Mr. MACPHERSON, M.P.P.: It may be that one end of the vat has been heating faster than the other. Your blowpipe must leak somewhere.

A MEMBER: Would you advise the washing of curds at any time?

Mr. RUDDICK: I think that in extreme cases, where there is a very bad flavor, or milk is over-ripe, it might be advisable to wash curds, providing you have water fit to wash curds in. But be careful you do not jump from the frying-pan into the fire. At too many factories the water is not in proper condition for washing curds. More cleanliness is needed in our factories. There are too many water barrels which are miscellaneously used. But certain bad curds can be improved by being washed in water at a temperature of not higher than 105°.

Mr. GODKIN: What is the difference between cheese made from four and five per cent. fat? Is the richer cheese the better?

Mr. RUDDICK: I have had no experience in making cheese from five per cent. milk. We have never been able to get milk of that quality in factories in Canada. I think

that if milk had five per cent. of fat, it would also likely have a larger proportion of the other constituents, and we would have slightly more cheese, but not a cheese richer to any appreciable extent.

Mr. FERGUSON : How would you deal with floating curd ?

Mr. RUDDICK : Floating curd is simply a bad gassy curd, in which holes have developed to such an extent that it will float. In such a case ripen the milk more, and use a trifle more rennet so as to hold more moisture.

Mr. HALLIDAY : If you had a rapidly working vat would you hand-stir or rake-stir ? For instance if you had a vat that would run off in three hours ?

Mr. HOARD : If milk is sent in sound and sweet it will work more slowly. It is only bad milk that threatens to get ahead of the maker. It is important that the maker should develop a good milk judgment, and that can be got only by practice.

Mr. RUDDICK : Under such circumstances as Mr. Halliday describes I would lose no time whatever, and stir hard rather than otherwise, as rough stirring would make it finish sooner. The only thing to do with over-ripe milk is to cut the curd finer and get rid of the whey more quickly. We have handled milk that has worked so fast that in three quarters of an hour after the rennet was applied the curd was piled.

Mr. W. J. ELLIOTT : What is the best way to get a bad odor out of cheese when there are no pin holes in the curd ?

Mr. RUDDICK : It is almost impossible to get rid of some bad odors in curds. We can get rid of them to some extent by stirring and exposing to the air. But in exposing to the air you must expose to pure air, for if the surroundings are impure exposure only adds further injury.

Mr. KERR : How would you prevent loss in making cheese ?

Mr. RUDDICK : You cannot prevent all loss in cheese-making any more than you can saw a stick of wood without making sawdust. Of course much loss is often caused by carelessness.

Prof. ROBERTSON paid a high tribute to Mr. Ruddick, and commended the Dairy School at Kingston to the dairymen of eastern Ontario, and said : It takes some courage for a public man to say " I do not know," but Mr. Ruddick has been able to say that. I think that the maker as well as the person who provides the milk needs a word of counsel and admonition. While the farmer must provide good milk that is not all that remains to be done. Every link in the chain of cheese production must be equally strong, or the whole thing will break down. The farmer is often blamed, because it is easy to blame somebody else. When milk is aerated the object should be to get pure air into the milk and drive out bad odors. It is also intended that good germs should get into the milk. All of these germs affecting cheese are not injurious ; some are beneficial. But how can the farmer or cheese-maker know, for few of them are microscopists ? Every germ that makes a bad smell is a bad germ ; therefore it is better not to aerate milk if the air is impure. If the cheese-maker's surroundings are bad, every stir he gives the milk or the curd sends in more bad germs. " Where did these red spot germs come from originally ?" is not as important a point as "Where did they get into that particular milk ?" If that discoloration was in the milk it would be distributed evenly in the curd. The fact that they are not evenly distributed points to the conclusion that they came into the curd later on. We exposed some skim-milk in an ordinary dairy building that had a nice, clean smell, and found that using that as a starter gives good sweet milk and cheese. A cheese-maker's best guide is his nose. If some cheese factories do not " smell to heaven," they do smell at least three miles across the concessions. If you go on making cheese for a while all these evil germs multiply ; and in this respect there is ten times as much danger as there was years ago, owing to the number of old factories.

Mr. HOARD : Would it not be a good thing for the factories to do as the soldiers used to do during the war—" move camp " now and then ?

Prof. ROBERTSON : Unless a cheese factory is as well drained as the average place in a town with a waterworks system, I think it should be moved every four

years. There has been a very great danger to the cheese in Canada from the United States dealers in rennet. I have been hearing all kinds of bad reports regarding vile odors in Canadian cheese because of bad rennet. Our janitor told me that complaints were being made that the cheese in the cellar was bad. I fortunately had kept some of the rennet in a bottle, and it had the same vile odor. Do not use rennet if it smells bad. Buy only such rennet extract as is perfectly sweet smelling. If a man makes a really good brand of rennet it will make its way to the front. If it becomes popular with a jump merely because it is cheap, you may save a few cents in buying it, but the country will lose thousands of dollars in the future. It is important that the cheese-maker should have a steam boiler to regulate the temperature to within one or two degrees. But that is not half the process of making cheese. The question of temperature, however, affects the growth of these various fermentations or bacteria, and gives good or bad flavor to cheese. It is also important that he should be able to regulate the temperature of the room where the cheese is stored. In one of our factories in the North West one of our patrons lives twenty miles from the creamery, and he draws his milk every five days, because the air is practically pure. But down here in Ontario, where you multiply factories and dairies, you multiply the dangers from these germs. We cannot please the English people unless we send them our dairy products in the sweetest possible condition. A good cold storage system could be put in each factory for $200, and that would save many more dollars. "But," you say, "we have the best cheese in the world." So we have, on the average, but the English Cheddar sells for four cents a pound above ours yet. If any dairyman or maker will go to Kingston Dairy School and get a few weeks' instruction, no matter what his experience has been, he will find himself capable of doing a better class of work, which will lift him out of that horrible nightmare of wondering whether that two weeks' cheese will go off flavor or whether it will pass. Go and learn these latest pointers.

Mr. AYRE: I think it desirable that every maker should visit each of his patrons. He should know the exact local conditions of every patron and understand the surroundings of every can of milk coming into his factory. In this connection, also, I may say that there is one feature of the trade staring us in the face that needs to be altered, and that is the existence of too many factories, which means poorly paid makers and poorly made cheese, comparatively. We will never take our proper position so long as we have so many small factories. We must have large establishments, in order to have the best conditions in making the best cheese at the lowest possible price. I believe in the maker getting good pay, and in the man who owns the factory getting good pay for the risks he runs It is a mistake for owners or patrons to cut down the pay of the maker, for it is usually at the expense of the quality of the cheese. It is easier to sell a big lot of cheese from a single factory than a small lot. It is very difficult to sell a lot of cheese, under fifty boxes; in fact it is getting difficult to sell a lot of less than one hundred boxes. This is an important point. There is such a thing as wanting to get a thing too cheap—and cheap and nasty too often go together. The market has taken a swing from the firm cheese that was formerly in favor to a fatter or richer cheese. My experience has gone to show that a fat cheese will develop a finer flavor than a stiff one. How is it that the taste of the people changes? I will tell you where the change has come in. We required that stiff cheese in the old days, because we had such conditions that we did not want them to change fast in case the people did not care for them immediately. But now cold storage can carry our cheese more rapidly, and we can afford to have a better developed cheese. During June the factories make what is called a deep yellow June grass cheese, which is not popular, and there is a very small market for it. A mistake is also made in coloring cheese; too much coloring is given, and that is not desirable. I have one more complaint to make. A good deal of cheese is ruined while being drawn from the station. We often find cheese coming to us with the boxes stained. They have not been damaged in the cars, and not in the factory; but they have been injured while being drawn to the station. They should be sent in a covered wagon—in a sort of "prairie schooner," so to speak. Cheese should not be drawn to the station in the middle of a hot day; better draw it in the night; certainly at some cool hour. Cheese should not be sent in unventi-

lated cars ; that means ruination to the article. We are coming rather too near to making too many cheese in Canada. In the years 1894 and 1895 there were too many cheese made, and prices were disastrously low. How are we to avoid it? In the first place we need to make a better article—a fatter cheese—and we should market the product as soon as possible after it is made, and not hold it too long on this side. We should aim at relieving the market. It is a bad policy to make cheese too early in the season. Early May cheese hurts both the market and our reputation. I really believe that if you could buy up all these early cheese and burn them it would pay the country. The same thing applies to the late made cheese. I believe there is room for an increase in two lines connected with dairying—an increase to the extent of one or two millions of dollars —and that is in the making of more butter and the raising of pigs. We do not need to make less cheese ; but we should improve the quality. We certainly should turn our attention more largely to butter and swine.

Mr. D. M. Macpherson, M.P.P.: There has been much lost from bad flavors in our cheese. I elevated the whey vat in the attic of a factory. That vat leaked a little, and some of the whey dropped into the milk vat. There were only a few drops, but we lost the entire make of cheese for those two weeks. That cheese turned out to be what is called a "severe stinker." Is it not a fact that too many farmers are drawing back whey in their milk cans, and is it not a fact that too often these cans are not properly washed? I believe the seeds of those bad flavors are incorporated in the cans and the cloths used in washing them, and these prove a fruitful source of injury to the quality of the cheese. That stinking whey is the refuse of cheese ; and the refuse of any animal or animal product is calculated to create disease or death. When we removed the cause of the trouble in this particular case, we found the good flavor come back into our cheese. Bad rennet will also cause a stinking flavor, and bad water and bad air will lend a bad odor to milk, and a bad flavor to cheese. I have traced up these causes in many cases myself. The suggestion about the cheese-maker visiting every patron is a good one I have adopted that plan in my factories, with advantage. Where a cheese-maker does that, he gains the confidence and esteem of his patrons. He must have their confidence and esteem before he can attempt to discipline them.

Mr. Newman : What is the best disinfectant to use in cleaning up a whey tank?

Mr. Ruddick : Take about a pound of copperas and dissolve it in ten gallons of water, and sprinkle about the factory, except where it comes in contact with woodwork, which it would turn a rusty brown color. Copperas is a splendid disinfectant.

Mr. Weir : I have been following up the work of Prof. Ruddick for the past year, and, with my makers, I have yet to find one person who has found fault with the work done. The first year or two I was in the business I thought I knew everything. I have been at it for nine years, and find I have yet much to learn. Some inspectors do not like to point out faults.

## COLD STORAGE FOR CANADIAN FOOD PRODUCTS.

An address upon the above-named subject was given by Prof. Robertson, Dominion Dairy Commissioner, and his remarks were illustrated by large charts giving plans of cold storage apparatus. A report of this address appears in the Creameries' Report.

Mr. A. A. Ayre : Prof. Robertson said that a comparative simple and cheap system of cold storage could be introduced that would bring the temperature down to 35°. Perhaps by the use of salt it might be reduced even lower than that point. The object of cold storage is to keep butter sweet and fresh. We have in the Province of Quebec a number of creameries which have cold storage at 35°, and even as low as 30°. Some of these creameries sent four weeks' butter at one shipment to Montreal. It is necessary that butter be kept at a very low temperature for five or six days before it is taken on

board the steamship. You will thus see that six or eight weeks must elapse before the butter can get into the hands of the British consumer, and I am of the opinion that butter cannot be kept in its best condition for eight weeks. Of course, the lower the temperature the longer you can keep it. If you could get a temperature of 10°, and hold it at that, the butter could be kept for sixteen weeks, but there is a limit to the time after all. Some people in New York assert that butter can be kept for a year, but I have never seen any kept for that length of time. My advice to creamery men is: No matter what system of cold storage you may have at home, do not keep your butter more than a week or so. Send it at once to some central point where it can be kept at a lower temperature. There was a time when I thought it would injure butter to keep it at the freezing point, but I have got over that. If possible, keep it at 32°, 20°, or 10°. We now keep it in Montreal at 23°. Regarding the comparison often made between Canadian and Danish butter, I would say that there is a difference between the two makes, and I would not advise our manufacturers to copy Danish butter. That butter is like print butter—it is butter with a quarter of an ounce of salt. It cannot keep; it is for early consumption. After it has been a week on the British market it declines and goes down very low in price. It is made to meet a certain demand and trade. Our butter, on the other hand, is like the Australian and New Zealand make It is a waxy butter. It is a better article than the Danish butter, but the English people are not properly educated up to that point yet. (Laughter and applause.) The Danish people buy nearly all the feed for their cows. They have educated the British taste by placing their butter on that market in a fresh condition. Let us take care of the quality of our butter and the price will take care of itself. The former will control the latter every time. We must be patient, and be content to receive at first the figure that our butter really deserves We are now, as it were, only sowing the seed. I think we ought to go on increasing at the rate of a million pounds a year, and there is room for us to increase it at a much more rapid rate than that. I believe that if farmers made no cheese in April and November they would realize just as much money for the make of the shorter term.

## A FORWARD MOVEMENT.

By Hon. Sydney Fisher, Minister of Agriculture for Canada.

The hon. gentleman, who was loudly applauded upon rising, said: I need not say to the members of the Eastern Dairymen's Association and to the people of Brockville how glad I am to be here again at your annual meeting. It was my good fortune to attend a meeting of your Association in this place some seven years ago, and I then derived a good deal of benefit from the discussions, as well as from the various papers read and the speeches made. And I am pleased to have the chance to again profit by the able and practical talks on dairy matters that I know I will hear on this occasion. It also happens that I now occupy the position of Minister of Agriculture for the Dominion of Canada, and for that reason I feel that I more than ever need the information you are able to give me. I have been following the occupation of farming for about twenty-five years, and I may say that one of the greatest helps I have had in that business have come from participating in such gatherings as these. We have, as farmers, neglected too much the coming together and informing ourselves regarding the details of our business. We have neglected too much the principles which underlie the business and the scientific facts pertaining to it. I do not know anything better for improving ourselves than by joining such associations and meeting together from time to time to discuss questions which will interest and profit us. Your great Province of Ontario is very fortunate in having such associations, so largely joined by your people, and so ably and vigorously conducted. You have the advantage not only of hearing addresses from dairy teachers and other professors of agriculture, but you also have the advantage of listening to a large number of practical farmers, some of whom are among the most successful agriculturists in the country. Coming in touch with this latter class of teachers

is a great benefit. The working out by practical men of the suggestions of the professors and scientists is of immense benefit to farmers generally. But scientific theories regarding agriculture are valuable only as they can be put into practice. I think that one of the reasons a certain amount of prejudice and discredit has prevailed amongst certain farmers against scientific information and educational work in agriculture is because they have not adapted themselves to the position by the use of a little common sense. Scientific information is necessary, but it is also necessary that we should be able to wisely apply it to our particular circumstances. If a professor should tell us that certain experiments have been successful on the grounds of his particular college or experimental farm, it does not mean that every detail of that work should be carried on by each of us on our land, as different soils and different climate, etc., would require different conditions. We should simply consider the principles that underlie the conditions upon that agricultural college or station, and then apply them to our own. If we apply these in every detail it may be that we will fail, and then the discredit will come to "book farming" or scientific information.

At the present time our attention is being largely turned to the question which Prof. Robertson has been discussing this afternoon : Cold storage is one of the important questions to-day. The food products of Canada are of the best quality, and should be kept up to the highest standard. This does not indicate, however, that there is no room for improvement ; but the improvement must take place largely in preserving the high quality of our products, which are apt to deteriorate with time if not properly handled. Our dairymen have conquered the cheese markets of the world. There was a time when Canadian butter not only had a good place in the home market, but also had a fair position in the butter markets of the world. That time has gone by. We have failed in our butter trade mainly because we have not adopted that principle of co-operation which has been so eminently successful in our cheese business. There is no doubt whatever that it is because of this co-operative work—one man making a more uniform and better cheese than many private dairymen could—that our cheese has taken so high a place in the markets of the world. We should, therefore, do the same in order to create and maintain a similar position for our butter in the markets of the world. It is rather more difficult, I admit, to maintain the principle of co-operation in the manufacture of butter, but with application and a determination to succeed all difficulties can be overcome. During the last few years the attention of practical dairymen has been turned in that direction, and already enormous strides have been made along the lines of advancement. I am now addressing a cheese association, but I think I can show you in a few words that the butter industry is almost as important to you cheese-makers as your own more immediate business. We are not going to stand still in the number of cows being milked in Canada. We are not going to stand still so far as the number of dairy stations are concerned. The question, therefore, is : "Are we going to add to the enormous quantity of cheese now produced in the country ?" This year, in rough figures, about ten millions of pounds of butter have been exported from Canada. If all the milk that was made into that butter had been made into cheese there would have been about twenty-five million pounds of cheese more made than has already been exported in the year. If you add that to the great amount of cheese sent to England, you will readily see what would have been the effect upon the British market. By putting that milk into butter you were able to increase the term when your cows work for you. The cheese factories are working for six months in the year ; but your cows ought to work for you at least nine months. You, as cheese-makers, are therefore greatly interested in regard to the quality of the butter placed by Canada on the British markets. By reason of improved quality and consequently improved reputation, our butter will command a larger share of the English trade, and receive a higher price, and this gain will come not at the expense of the cheese business, as the butter will be produced from milk yielded in winter while the cheese factories are closed. This can only be done, however, by keeping the butter in absolutely cold storage from the time it is made until it is put upon the steamers and marketed in the old country. I believe in this so much, and have been so impressed with the cry that has gone up from the whole country for such a plan, that I considered it my first

duty, when coming into office as Minister of Agriculture, to try and turn my attention to working out the problem. Although not yet absolutely perfected, I believe I have worked out a practical idea, and that next summer there will be a perfect chain of cold storage from the Canadian farm to the British market. (Applause.) And I think this will be done without any undue expense. I consider this putting of our food products on the British market in the best possible condition is so important to the welfare of the farmers, and of the country at large, that no man, whatever his business may be, will object to a reasonable expenditure in this behalf. I therefore feel that I will have no difficulty when I ask the House of Commons to give me the necessary funds for carrying out these plans.

I feel a good deal impressed with the fact that the live stock of Canada, and more especially our cattle, have not been generally improved within the last few years. This is a regretful admission to have to make, but I fear it is too true. In the first place, our exports of cattle have not been largely increasing. Our attention of late years has been turned more to dairying, and while to some extent, and in various ways, our dairy farmers have been improving their breeds, I do not think they have done so to the extent that is necessary. It would almost seem as if in the change from beef cattle to dairy breeds, we have come to a dangerous mixture of breeds, and we are in danger of losing the types of dairy breeds altogether. I am afraid that too many farmers have not been crossing their stock with skill ; too often the wrong type of animal has been used. I have drawn your attention to this matter so that you may study how this difficulty may be overcome, and how you will get to that point when the breed shall be clearly defined. The science of breeding is one of the best defined known to agriculture. The work of developing a certain type of animal is one that requires the highest skill and needs the closest attention of the farmers of the country. I therefore trust that in the great changes now going on in the raising of live stock—in turning from the old beef breeds to the dairy strains— that skill and careful attention will be exercised to the greatest possible extent ; so that in the new cow now being developed for the dairy, we may get an improved fixed type of an animal that will give the largest production of milk and butter-fat at the lowest cost.

I suppose that most of you are aware that at last session of Parliament, I introduced an Act for the purpose of bringing about the branding of Canadian dairy products. In introducing it, I said that I did not wish to have it made into law at that session, but that I desired to bring it before the minds of the dairymen of the country, and so find out how far, in the interests of the trade, we could go in that direction. That bill was intended to go in what I consider the right direction, and along the best lines. I am not ready to say to-day that the Bill should be adopted in all its details. It is open to amendment and improvement. I am of opinion that in dairy associations such as this, the question of branding, and this proposed bill, should be fully and freely discussed ; for it is most desirable that I should get all the information possible from those who are practically engaged in the business of cheese and butter making. There are three or four different parties interested in this trade ; first, the exporters, next, the buyers, then the makers, and last the great mass of patrons of factories. I am anxious to get information regarding the particular needs of each and all of these very necessary classes in the great cheese trade of the country, so that I may be able to use my utmost endeavors towards setting our immense trade in dairy products on a firmer and more prosperous basis than ever before. (Applause.)

## CHANGE METHODS.

By Ex Governor W. D. Hoard, Fort Atkinson, Wisconsin.

It is the easiest thing in the world for men to go along for years with bad wasteful methods. Somehow we had rather stay by a method we are used to, be it never so bad, than to adopt one we are unacquainted with, even if it is a great deal better. But this sort of mutual inertia or lazy contentment is the worst foe to true progress.

It is every man's bounden duty to stop waste; it is equally his duty to make all the business forces under him do *their* full duty. The farmer is a general. Acres, machinery, cows, hired men, are his infantry, artillery, cavalry and engineer corps. He must train *himself* in the art of agricultural warfare. He must *not* let any of these forces go to waste; and he *must* keep them up to their best effort if he expects to win a victory in the shape of good profit.

All successful generals are quick to learn from their mistakes; they are great students of the methods of other generals. This is a great help to success. If they find their methods are wrong, they do not blindly adhere to them. They have learned that great law of true human guidance, "Never compare things that differ." That means that every difficulty, every situation is governed by its own law. That applies wonderfully to the problems of cow farming.

Now, one great source of waste and fruitless effort is refusal to change methods. The farmer was brought up with the cows, and thinks he knows all about them. He measures every new truth by an old error.

Let me illustrate: A man had heard that Jerseys were good butter cows. He bought one that was fresh in milk. He took her from a kind master and comfortable barn, to a cold, uncomfortable stable, and turned her out to drink ice water on a very cold day. When she came into the stable she shivered, and in a week had shrank her milk flow one-half. He recounted to me all these circumstances, and said he did not think Jerseys were hardy. That man would have measured a diamond by what he knew of limestone. When I undertook to show him that a highly organized dairy cow, one that would yield twice as much butter as any cow in his herd, should be treated according to the law of her own being, not according to his bad and ignorant methods, he replied by asking if I thought he was going to change himself over to suit a cow?

Two men in my county have been dairymen for twenty years. Each started with 160 acres of land and live only about a mile apart. One we will call A, and the other B. When they started with cows, A was in debt for nearly the price of his farm. B was out of debt. A early saw that he needed the best cow he could get He was a good judge, and would pay a large price for a good animal. He became interested as a student in the physiology of the cow, and read everything he could find that would give him more light. B said it was all nonsense to read so much humbug. A bought the best registered Jersey sire he could find and almost paralyzed the neighborhood by paying $300 for him. Twelve years ago he built a silo. That enabled him to nearly double the size of his herd on the same land. Then he took up the study of the feeding problem. B calls A a crank. A is now worth ten times what B is. A has changed his methods for better ones, and is to-day wealthy, intelligent and widely respected. B is worse off than he was twenty years ago. He knows but little, if any, more; his cows are of the same poor sort; he "don't believe in all this blamed humbug about breeding, feeding, silos, and such." His family have grown old, his expenses have increased, but his revenue has remained the same, and now he is in debt. He has rolled the spirit of non-progression under his tongue like "a sweet morsel," and now he is ugly and sour at everybody? What is the cause?

This,—he would not change his methods. He would not imbibe knowledge enough to have a good judgment of methods. He would not use his intellect, train it, guide it, and refine it. He did not realize how deep this problem of successful dairy farming is, and that a man with a shallow unfurnished mind cannot fathom it.

### The Cost Price of Milk.

It depends on the cow and the way she is fed and managed. Here is a bit of practical experience for you. A large milk producer in Ulster county, New York, writing on the subject, says: "The poorest cow I ever owned gave 1,000 quarts a year, at a cost of over five cents, while another cow produced over 7,000 quarts, at a cost of less than three-fourths of a cent a quart.

"A year ago the food cost per cow per day was 26 15 cents. Of this the farm furnished 8 cents, and 18.15 cents was purchased. On this expense the herd averaged 14 quarts a day at a cost of 1.86 cents per quart. The ration was 12 pounds hay, 8 pounds corn fodder, 10 pounds wheat bran, 6 pounds hominy and 3 pounds cottonseed meal. An effort was made to reduce the cost by a better study of the feeding question, and the following ration was adopted: Twenty pounds hay, three pounds oat straw, three pounds oats, six pounds wheat bran, four pounds buckwheat middlings, and two pounds cottonseed meal. This ration cost 21¼ cents a day. Of this, 10 cents was raised on the farm and 11 cents purchased. The milk yield increased to 15 14 quarts a day, making the cost per quart 1.4, a saving of over three-quarters of a cent per quart per day. In 1888, my cows averaged 1,000 quarts per cow, and the milk cost me 2.8 cents per quart. Last year the yield was 3,754 quarts per cow. This result was brought about by weeding out the poor cows and putting good ones in their place. To know the good from the bad, the milk of each cow was weighed and tested at regular intervals. 'I guess so' was discharged, and 'I know so' put in his place."

Now, think these facts over and and tell me candidly, is it not best to abandon our old wasteful ways of managing cows, and adopt some of these new ways? Let us always remember that cows cannot yield milk solids without suitable materials from which to make it, and the cow capable of producing these solids in profitable quantity cannot do on the coarse fare suitable to the lower grades of stock. Neither can they stand the exposure which common stock will endure, without serious discomfort and injury.

### Some Forms of Waste.

The Experimental Farm of Ontario reports the amount of food consumed, bedding used, and manure produced by a calf during the first three years of its life. The total weight including 6 tons and 38 one-hundredths of a ton of straw used was 29.64 tons. This manure was analyzed, and the value determined on the basis used for commercial fertilizers. On this basis the value of the manure produced during the three years was $118.57.

This shows the enormous waste going on when the farmer does not look after the manure. The fertility, or producing power of your land, is your capital. Did you ever notice how much less a rich soil feels a bad drouth than a poor one? The vicissitudes of farming are very much lessened by keeping the land rich. One of the chief reasons why I have been so persistent in advocating the use of land plaster in the stables is to save the waste of nitrogen.

### Does It Pay to Study the Feed Question.

Here is one way of clearly demonstrating it: Dr. Babcock found that the use of ensilage greatly increased the churnability of cream. It seemed to produce the same effect that is seen in the cream when the cows feed on June grass. Every farmer's wife knows how much more easily and thoroughly the cream comes at that time than later when the feed becomes dryer and more woody. The same effect is produced by the feeding of water.

Dr. Sturtevant, at the Geneva Station, found that milk from early mown hay, corn meal and bran yielded up 84 per cent. of its fat, while that from late cut hay and gluten meal yielded up only 64 per cent. Here was a loss of 30 per cent. because of the kind and condition of the food.

Can farmers afford to shut their eyes to better study and knowledge on this question? There is money in it.

There are 800 patrons of the Hoard Creameries. Among them, at each one of the ten creameries, are men who produce milk at 50 to 75 per cent. less cost than others. Every penny of reduced cost means that much of increased profit. Yet it is very hard to get those unsuccessful ones to study. In these times of low prices, they are groaning with financial colic, yet no man can get them to see where the waste is. Are there any such farmers in Canada?

### Developing Heifers.

In the development of the heifer to be a profitable dairy cow, a great deal depends on the sort of man that handles her from calfhood to her second milking form. She must start with good dairy ancestry. That is the foundation, but not the superstructure. We have reason to believe that a large proportion of poor cows could have been made good ones if they had fallen into the hands of men who knew how to develop them rightly. (1) Prevent growth of fat and beefy tendencies. (2) Use constant gentleness, and frequently handle the udder. (3) Breed at 15 months, so as to start the growth of the maternal functions while the body is easily moulded. (4) Feed liberally of milk-producing food so as to develop the growth of the udder all that is possible.

An Arkansas man asked my neighbor, C. P. Goodrich, the questions, "How are milk vessels developed in heifers? How is the milk flow stimulated?" Mr. Gooderich has been a very successful producer of fine cows, and his answer was: "Bring them up in the way they should go, and when they are old they will not depart from it, if they are well-bred dairy heifers. By this I mean, bring up the heifers to consume large quantities of milk-producing food. There are some kinds of food that will induce growth but not fat. Use such foods."

You can spoil the heifer for milk by feeding her grass fattening foods.

Professor Roberts aptly says: "If you ask such a heifer to turn all her food into milk, she will say, 'I can't do it; you taught me to make tallow.'" There are lots of spoiled, wasted cows. Good cows are too scarce to spoil one in the making.

### How Shall we Raise Protein Cheaply?

Science and experience both agree that if we expect to produce milk cheaply and abundantly, not only must we have a good dairy cow, one that is fitted for the business, but we must as well fit the feed to the cow. She produces milk, milk is the best balanced food in the world. Balanced how? By having in the truest proportions the three ruling food elements carbohydrates, fat and protein. The cow cannot change her nature, nor her milk. She depends upon her master for knowing enough to do the right thing. Poor cow; how fearfully and frequently she is deceived.

Said an old lady to me once, "Women and cows know how terribly lacking men are." Now, if the cow yields a balanced milk abundantly—mind you, abundantly—she must have the right food to make it of. In every pound of milk, she is obliged by a law, she cannot escape, to put such a per cent. of casein or curd. That is almost pure protein. Where will she get it? From her food. How will she get it from the food if the farmer does not furnish it?

All of the protein foods are somewhat expensive, more so at times than others. The best among them is cottonseed meal. That is the richest in protein. We must buy that; then comes oilmeal, bran, gluten feed and meal, all of which we must buy. Can we help ourselves and produce this food cheaper than to buy it? This is an intensely practical question. For years I have been striving to make the readers of Hoard's Dairyman understand this matter. My object is to keep up the yield of milk, and at the same time to have more of the resulting money with the farm.

Prof. Robertson conceived the idea of putting in the silo a balanced food that would do away with the necessity of buying it in another form. His plan was to grow corn, horse beans, and sunflower heads, and ensilo them together in a balanced ratio.

The corn for the carbohydrates or starch, the beans for the protein, and the sunflowers for the fat. The same object is striven for by those farmers who grow peas or vetches abundantly with corn or barley. Thousands of farmers have been prevailed upon to include peas in their dairy farm management. They succeed or fail just in proportion, barring adverse seasons, as they understand how to grow peas. The old Indian said, "Know-a-heap is big thing when you hunt otter." "Know-a-heap" will pay here too.

Some experiments in the way of growing flax with millet, and oats, for hay, have been made, notably by Mr. Currie, of Minnesota. He speaks very highly of the combination as a milk food, and says: "My theory is that during the growth of the plant, it had more protein without the excess of oil, so I sowed millet, flax and oats together, and I cut it at a certain stage, and it is the best food I ever had." The combination was cut when the millet was fairly headed out, and the flax seed, say, half grown.

Concerning this combination, Prof. Snyder, of the Minnesota Experiment Station, says: "Mr. Currie's experiments in regard to the use of flax at a certain stage, is borne out by the conditions of the plant during the stage of its growth. As the plant matures, the starch is used in the formation of the fats and oils, and he has cut the plant at the proper time, when the nitrogenous (protein) property of the plant is most developed." Now, these are hints. Take advantage of them and see what you can do to solve this reduction of cost, and still keep up quality and quantity of product. Let me enunciate once more.

The first factor in the problem of a cheaper production of milk is the cow, a dairy cow, a good cow. Take the first step first, and make a determined effort to do business only with a true dairy-bred cow. To this end the dairy farmer must become more of a breeder. This is the first step.

The next is the right sort of food, dairy food, food that will bring dairy results; the next, understanding and skill in feeding the right food; next, the production of the *right* food, not some other food, on our own farms, as far as possible: next, the right care and handling of the cow.

The nearer we come to perfection in all these points, the greater will be our profit. We must make milk for less per hundred. There is no help for it.

The inevitable growth of the business must bring that result. We must produce butter and cheese for less money. We no longer control the output. Other countries are reaching for our markets. Our own production is increasing. Every line of human effort is in the same category.

We must make milk by the acre, and the hundred pounds. It is stupid for us to persist in using double the number of acres and cows to produce what one-half of those forces might just as well produce. We must learn to make just as much profit with milk at 65 cents a hundred, as we once did at $1 a hundred. We can do it if we will address ourselves to reformation of our cows and our ideas and methods.

Prof. ROBERTSON: Indian corn and sunflowers or horsebeans are a good combination. The horsebean does not grow well in some places; it has done very well with us. But we have found during the past season that the Soja bean is easily grown, and it makes good and cheap food for cows.

Hon. S. FISHER: I have just been asked a question regarding ensilage, and I will give my reply for the benefit of all. I have not yet succeeded in making an ensilage that was not slightly sour. I consider that the sourness or acidity of ensilage depends very largely not merely upon the condition of your building, but also upon the maturity or immaturity of your crop. Corn ought to be put into a silo when the crop is slightly on the ripe side—when as old or even older than when considered fit for eating on the cob. If the corn is on the green side let it wilt a little longer, so that there will not be so large an amount of moisture in it, and consequently there will not be such a rapid and deleterious fermentation in the silo. If the corn gets too old, or is frozen, and the leaves of the crop are too dry, it is well to sprinkle a little water before putting it into the silo. See that the silo is air-tight, and have the crop well tramped into it so that the air will not be allowed to form between layers of corn.

## REGISTRATION AND BRANDING.

Prof. ROBERTSON then proceeded to describe the proposed legislation to amend the Dairy Products Act by providing for the branding of cheese and butter and for the registration of cheese factories and creameries. The following are the provisions of the bill introduced by the Minister of Agriculture at the last session of Parliament, but withdrawn in order to get a fuller expression of opinion from all classes of dairymen:

AN ACT TO AMEND THE DAIRY PRODUCTS ACT, 1893.

HER MAJESTY, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. This Act may be cited as *The Dairy Products Amendment Act*, 1896.

2. This Act shall come into force on the first day of January, 1897.

3. Section four of *The Dairy Products Act*, 1893, is hereby repealed and the following substituted therefor:

"4. No person shall apply any brand, stamp or mark of the word 'Canadian,' 'Canadien,' or 'Canada,' as a descriptive term, mark or brand, upon any cheese or butter, or upon any box or package which contains cheese or butter, unless such cheese or butter has been made in Canada.

"2. No person shall knowingly sell, or offer, expose, or have in his possession for sale, any cheese or butter upon which, or upon any box or package containing which, the word 'Canadian,' 'Canadien,' or 'Canada,' is applied as a descriptive term, mark or brand, unless such cheese or butter has been made in Canada.

"3. No person shall knowingly sell, or offer, expose, or have in his possession for sale, any cheese or butter upon which, or upon any box or package containing which, is printed, stamped, or marked, any month other than the month in which such cheese or butter was made; and no person shall, knowingly and with intent to misrepresent or defraud, sell, or offer, expose, or have in his possession for sale, any cheese or butter represented in any manner as having been made in any month other than the one in which it was actually made.

"4. The owner of every cheese factory or creamery where the making of cheese or butter is carried on, shall send by registered letter to the Department of Agriculture at Ottawa, particulars for the registration of such cheese factory or creamery, as set forth in Schedule A to this Act.

"5. The agricultural and dairy commissioner, or such other officer of the Department of Agriculture as is designated by the Governor in Council, shall forthwith send by registered letter to the owner of such cheese factory or creamery, a certificate of registration, showing the registration number allotted to such cheese factory or creamery.

"6. No factory salesman or other person shall knowingly sell, or offer, expose, or have in his possession for sale, any cheese or butter which is made in any factory or creamery in Canada—in the case of cheese, unless the word 'Canadian,' 'Canadien,' or 'Canada,' and the registration number of the factory in which it was made, together with the date on which it was made, are printed, stamped, or marked in a legible and indelible manner in figures and letters not less than three eighths of an inch high and one quarter of an inch wide, upon the cheese itself before it leaves the factory where it was made, and unless the word 'Canadian,' 'Canadien,' or 'Canada,' and the registration number of the factory in which it was made, together with the name of the month in which it was made, are printed, stamped, or marked in a legible and indelible manner in figures and letters not less than three-eighths of an inch high and one-quarter of an inch wide upon the box or package which contains such cheese; and in the case of butter, unless the word 'Canadian,' 'Canadien,' or 'Canada,' and the registration number of the creamery in which it was made, are printed, stamped or marked in a legible and indelible manner in figures and letters not less than three-eighths of an inch high and one-quarter of an inch wide upon the box or package which contains such butter.

"7. No person, with intent to misrepresent or to defraud, shall remove or in any way efface, obliterate or alter, the word 'Canadian,' 'Canadien,' or 'Canada,' or the date, or the figure or figures of the registration number on such cheese, or on any box or package which contains such cheese or butter.

"8. Any dairymen's association or any dairymen's board of trade, or any syndicate of cheese factories or creameries, may apply to the Department of Agriculture for the registration of a trade mark for use on cheese or butter, or on packages containing cheese or butter: and for the purposes of this subsection the expression 'syndicate' means a number, being not less than fifteen, of cheese factories or creameries, which are united in an organization for the purposes of using the services of a dairy instructor and inspector.

"9. When a certificate of the registration of a trade mark has been issued, no person shall apply such trade mark upon any cheese or butter, or upon any box or package containing cheese or butter, except in compliance with the regulations made in connection therewith, and after being duly authorized to use and apply it.

(*a.*) A certified copy of the regulations made by the dairymen's association or the dairymen's board of trade, or the syndicate of cheese factories or creameries, in connection with the use of the trade mark, must be sent to the Department of Agriculture with the application for the registration of the trade mark.

"10. Every person who, by himself, or by any other person to his knowledge, violates any of the provisions of this section, shall, for each offence, upon conviction thereof before any justice or justices of the peace, be liable to a fine not exceeding twenty dollars, and not less than five dollars, for every cheese or box

or package of butter which is sold, or offered, exposed, or had in his possession for sale, contrary to the provisions of this section, together with the costs of prosecution; and, in default of payment of such fine and costs, shall be liable to imprisonment, with or without hard labour, for a term not exceeding three months unless such fine and the costs of enforcing it are sooner paid."

4. The said Act is hereby further amended by adding the five following schedules thereto:

"SCHEDULE A.

"Particulars for the registration of cheese factories and creameries:

1. Name of cheese factory or creamery.....
2. Where situated—
   (*a.*) Province .....
   (*b.*) County .....
   (*c.*) Township or Parish .....
   (*d.*) Post office .....
   (*e.*) Telegraph or telephone office .....
   (*f.*) Railway station or shipping port.....
3. Name of owner.....
   Post office address.....

*If a co-operative dairy association or joint stock company:—*

   Name of secretary.....
   Post office address.....

4. Registered brand or trade mark, if any .....
5. Registered number allotted .....

The above is certified correct.

.....Owner.
.....P. O. Address.
.....Secretary.

Witness.....
.....P. O. Address.

Witness.....
.....P. O. Address."

"SCHEDULE B.

"Particulars for registration of a trade mark for butter and cheese:

1. The name of the dairymen's association, the dairymen's board of trade, or the syndicate on whose behalf application is made, is .....
2. The association, or board, or syndicate, was organized .....18...
3. The cheese factories or creameries which are included are situated in the county or counties of .....in the Province of.....
4. The name of the person appointed as secretary of the said board of syndicate is .....of the.....of .....in the county of .....and Province of.....
His post office address is .....
5. The trade mark for which a certificate of registration is applied for is.....
6. A true copy of the regulations made by the said association, or board, or syndicate, in connection with the use of the said trade mark, certified to by the president and secretary of the said association, or board, or syndicate, is attached hereto.

Signed.....
.....President.

Signed.....
.....Secretary."

Prof. ROBERTSON then said: I think that when an article of food is used the consumers should be fully acquainted with the place of production. The Bill provides for the branding of the word "Canadian" on all cheese made in Canada, and also provides for the branding of the date of make on the cheese and butter. I would also favor the branding of the date of shipment to England, so that it could not be held after it reached Great Britain. He then referred to replies to questions sent to leading dairymen and dealers throughout the country as to the proposed legislation, and said that although the answers were not all in, yet the replies were largely in favor of the principle of the Bill. On the question of registration of factories and creameries 250 had said "Yes," and only sixteen said "No." For dating the month of make on cheese, 279 said "Yes," and forty-eight "No." For dating the month of make on butter 170 said "Yes" and twenty-nine "No." It was fair to expect that the others yet to come in would be in proportion. Among those asked to submit opinions were 114 salesmen, and 101 were either presidents or owners of factories or creameries.

Mr. M. K. Everts, after referring in a few sentences to the success of the convention, proceeded to speak directly to the question introduced by Prof. Robertson. He said: About three years ago a Bill regarding the branding of cheese was brought up in the House of Commons by Mr. McLennan, of Glengarry. Nearly every dairyman and every dairy board in the Province was opposed to it, and denounced the Bill. When this Bill came before the House at last session, I also considered that it was not in the interests of the dairymen of the Province. I brought the matter to the attention of the Brockville Cheese Board, and a committee was appointed, of which I was chairman, which committee came to the decision that placing a date upon butter or cheese, excepting the date when shipped, would be a detriment to the dairy interests of the Province. Now, when we have just about got to the top of the rung, after carrying away so many prizes at the World's Fair, I think it is a mistake to have to put the word "Canada" on our cheese. If the English people want cheese from the Brockville section they ask Mr. Ayre or Mr. Derbyshire for Brockville cheese. I regret to have to say that cheese from other sections have been branded "gilt edge factory, Brockville section, Canada." There was no such factory in the section. We do not want any of these inferior goods masquerading under the name of Brockville section. It is not the consumers of Great Britain but the speculators there who have been planning and petitioning for this change. They have complained of our making June cheese and selling it for September. Now, if we can make a June cheese that an Englishman with his keen nose cannot tell from a September cheese, it is a pretty high compliment to our early cheese. (Applause.) Why brand our cheese? We might as well brand every lamb and every colt so that the Yankee buyers would not have the trouble of deciding on the merits of the animals. This year the cheese made in the latter half of July were superior to those made in the first half of August, and the cheese made in the latter half of August was superior to that made in the first half of September. Cheese should be bought upon its merits, and not according to date. The best cheese should get the highest price irrespective of age or date of make. The greatest expert in Great Britain could not tell the difference between a cheese made on the last day of July and one made on the first day of August. Brand the date, and the Englishman would say, "Aw, that's July cheese, don't you know; I really cawn't have it." (Laughter and Applause.) If the Government persists in introducing the proposed legislation, the dairymen of this Province will arise in a body, and the Dominion capital has never seen such a body as will go there to protest against the Bill. What the dairymen would like to have is a brand showing the district in which the cheese was made, and a number for each factory, which would be registered. Then the sections which made poor goods would have to come up to the higher standard of the other sections or take a lower price for their product. But with such incentive to friendly rivalry there was a likelihood of all going forward to further advancement.

Mr. D. M. Macpherson, M.P.P.: I regret the position Mr. Evertts has taken regarding the branding and dating of cheese. The arguments he has put forth seem to me to be rather against the position he has taken. We all know that there has often been a misrepresentation of the dates of cheese made in this country. If the buyers do not know that we can make as good an early cheese as a late one, by branding the cheese we will let them know. It is well that we should let the British dealers and consumers know that we can produce a first-class quality of cheese in July and August. We know that it has occurred that the cheese made in one month has been represented as the make of another month; and we know also that a large amount of cheese has been held back, stored in different places in this country, thus creating a large fluctuation in values; and we know that producers have not received enough for their labor on account of this fall in prices. I believe it would be in the interest of the farmers who produce milk for cheese factories, and for the trade generally, if cheese was promptly forwarded in the best condition, and placed early in the consumers' hands. I am bold enough to make the statement that I believe in the near future Canadian cheese if thus branded would have even a still higher reputation in the British markets. There can be no objection to the branding of the name of any particular section or factory, or a cheese or box in addition. The Bill would not prevent the placing of any such

special mark. We want to have an increased reputation for our cheese. I repeat that it has been admitted in all lands that our cheese has often been misrepresented in regard to date of making, and this has caused suspicion in the minds of many men in England. In fact, I have letters from men over there complaining of this condition of affairs. If we place in the hands of these men the actual date of making we will establish a direct communication of confidence between buyer and seller, and that will develop further confidence. If there is anything that will prevent fluctuation it is sending goods forward regularly, and if any speculator wishes to speculate with early cheese let him do so at his own risk. I think it is well to have the numbers of the factories so that we will be able to find out what factories have practised dishonesty or done anything to injure the general dairy interests of the country. The producer of the milk and the consumer of the cheese are the persons whose interests should be mainly maintained. The middlemen on the whole are, I think, honest men; but there are some who have not toed the mark in this respect, and we must take some means to protect ourselves against dishonesty, and in our own interests keep such men straight.

It was then moved by Mr. R. G. MURPHY, and seconded by Mr. J. H. SINGLETON, "that in the opinion of this meeting it would not be in the interests of the dairymen of Ontario to have the date of making placed upon our cheese."

Mr. AYRE: The word "Canada" must absolutely go on all boxes of cheese at present when they are exported. I would personally favor the word also going on the cheese itself. Branding would mean that all cheese, without any exception, would be put on the same basis. In the month of April it is as warm in the Ingersoll district as it is in the St. John or Saguenay district in May. Here is a chapter from our own experience: We received a lot of cheese, dated July, August and September. It was a marvel to us how these cheese were so clean, and if you had turned the dates around you could not have told the July's from the September's. We got an order for "Young finest," and as we had no cheese equal to these in stock, we sent the lot I have described. But they cabled back, "Cannot accept—dated." The dating killed the sale of that lot of excellent cheese. Personally, as an exporter, I do not care what may be done; I really think we will make more money out of the business. I am surprised that the question of dating butter should come up. I think it would be a fatal mistake to date butter. We may venture to date cheese, because we are on the top of the pile of competition; but it would be dangerous to do anything in the way of dating butter.

Mr. A. HODGSON (Montreal): I am an exporter of cheese, and I am also an Englishman, and I have heard the Englishman's general character described here in a not very flattering way. (Laughter.) When this matter was brought up three years ago, I spoke against it—and so did Mr. Warrington and Mr. Ayre. The English people have grounds for objecting to cheese being sent late after making, and from personal observation when across the sea, I can quite understand their desire for dating the make of cheese. I have spent about a dozen years in Canada, and am interested in her dairy products to a very considerable extent. No foreign produce can enter England unless the name of the particular country sending that product is branded on it clearly and distinctly. When this Act was introduced five years ago, some of us did not know of it in time, and some of our food products were seized. I may say that the Englishman wants as few marks as possible on his cheese. He wants to buy cheese, not paint. Every English dealer has his own brand. No matter what brand you may put on your cheese, we shippers must also put on our brand, and the importers must also put on theirs. The fact that you put on the brand "Brockville Section," will not affect any importer at all. If it comes from Brockville, we so report it. If we find any section turning out particularly good cheese, competition in Montreal compels us to announce that fact, and advertise it, so to speak. You may rest assured that no matter what resolution is adopted here, the English people are ready at all times to pay the proper price for any product they may get. I look for the time when, at such gatherings as this, the exporters and salesmen will meet face to face and talk in a friendly way about their mutual interests.

Hon. SYDNEY FISHER : I did not come here to impose my views upon this meeting, but I would like to say a word or two in regard to what has been said during this discussion. In the first place, I am glad to see that there is so much concurrence with the major portion of the Bill. I would regret exceedingly if the name "Canada" was not put upon everything sent from this country. I believe every Canadian should be willing to go that far at least. Those who are not up to the mark with their products should be brought up to the mark. On the question of dating, I am not going to argue one way or other. I am merely going to point out the impression made upon me by what has been said. That impression is rather in favor of having the date put on, and simply for this reason : Instances have been stated where Canadian July or August cheese were shown to be just as good as the cheese of any other month. I do not accuse the exporters at Montreal of sending July and August cheese as September cheese ; but I do know that a good deal of July and August cheese has been sold as the product of September. As but little cheese for the two first months named is sent to England, the people there take it that good cheese cannot be made in July and August ; and until that opinion is changed Canadian makers must be content to receive lower prices for their July and August make. For first year after dating, there would be but little advantage seen, but there would be no serious disadvantage ; while in two or three years July and August cheese would command a higher price than now, and the market would be more evenly sustained. When the Englishman learns that cheese made in July and August is as good as that made in any other month, he will soon learn to pay as much for it as it really deserves. France and Denmark see to it that nothing is sent from these countries except it has the brand "French" or "Danish," and the English consumer appreciates that fact. And if we brand our dairy products, the Englishman will say, "Those Canadians know that they have a good thing, and they are not ashamed to let us know, and therefore it is worth our confidence." There is a provision in the Bill permitting the use of such a brand as that proposed by Mr. Everts. In regard to the difference between cheese made on the 31st July and the 1st of August, if the cheese were simply dated "July" and "August" there would be room for objection, but with the day of the month on, such objection would not have much force. I was not aware of the fact before that the Englishman did not like the branding of cheese ; but on account of other than Canadian cheese being sent from this country, I believe it is essential that our genuine product should be marked "Canadian." I do not think that under the new conditions of rapid transit in cold storage it will be so necessary to date butter, but under the old conditions it was necessary, as too often the butter was held too long, and so the interests of the producer were injured.

Mr. EVERTS : I see that by the returns received by the Dairy Commissioner some 500 have so far favored the dating idea. I have here the names of over 1,000 of the sturdy dairymen of this section who agree with the position I have been advocating. Dating cheese means a loss of thousands and thousands of dollars to the hard working dairymen of this country. It would at the best be more than two years before the goods would be bought upon the date of the cheese and not upon the merits of the article.

Mr. A. C. WIELAND, Montreal representative of the Co-operative Wholesale Society : I have received reports from my firm that they have often found August cheese—and goods bought as August cheese—equal to and better than that made in the first week of September. Dating or not dating cheese will not prevent dealers selling certain months' makes, but dating cheese would certainly prevent a man from offering another month's make as September's, at a price at which that month's make could not be bought.

An animated scene was then presented. A dozen men were upon their feet at one time all eager to talk to the motion, and nobody could be heard for a while as a large number of those present were repeatedly shouting "Vote." Mr. Derbyshire's powerful voice at last was heard calling for "Order," and, upon a measure of silence being realized, he stated that as the case had been fully presented, and the Minister of Agriculture had practically closed the debate, it would not be prudent to extend the discussion, more especially as it was within a few minutes of the time of the banquet to the members of the Association.

The resolution was then read and adopted by an overwhelming majority.

## THE BANQUET.

On Thursday evening the Association was entertained by the citizens of Brockville to a banquet in the St. Lawrence Hall, which was largely attended. The Island City Band and Orchestra was present, and, with some popular vocalists, added to the pleasure of the occasion. The *menu* was an excellent one, and the whole affair reflected credit upon those who had the matter in charge.

Many speeches were made, several of them being heartily received for their wit or practical character. The addresses of the Ministers of Agriculture were each loudly applauded. Following is a condensed report of these two speeches:

Hon. Sidney Fisher said that in the position he occupied he was responsible for the health and prosperity of the agricultural interests. These were, however, too great and important for any one man to fully understand, and he looked for assistance in the hearty sympathy and co-operation of all engaged in that industry. The agricultural interests of Canada were looming up larger and greater than ever before. People were beginning to appreciate the dignity of agriculture, and realizing that the farmer was not simply a drudge; that a man to be able to solve agricultural problems and riddles must have brains and ability as well as muscle. Agriculture in Canada is advancing with rapid strides, and the possibilities of the future were great. We have the opportunities and the men who can take advantage of them. The duties of the Dominion Minister of Agriculture, were, he took it, to look particularly after the trade in agricultural products. The Minister for Ontario paid more attention to the education of farmers and he was doing it well. He paid a high tribute to the ability of Mr. Dryden, and referred to the Agricultural College of Guelph, which, under his (Mr. Dryden's) supervision had become the leading educational institution of that kind in America. It was doing a great work for the Province of Ontario. A grand work was also being done by the farmers' institute system established in Ontario. He referred to his recent visit to Washington, where he had met with a most cordial and kindly reception. There may be and are a few in both countries—men of the jingo stamp—who would like to stir up trouble, but the great hearts of the peoples of the United States and Canada beat in sympathy and unison. He referred to the great increase in butter exports during the past year and the possibilities that lay in that line. The pork industry was one capable of great development, as Canadian hams and bacon had a high reputation in the English market. He referred to the extravagance in conducting farming operations, in not saving and caring for waste products as should be done, in allowing weeds to take the place of useful crops, and wastefulness in the methods of feeding stock. Much might be learned in this respect from the small farms of Belgium, Holland and Denmark. The best advantages were to be gained by organization and co-operation, as had been done in connection with the cheese industry.

Hon. John Dryden spoke at considerable length, and in a most practical way, upon the subject of the Ontario Agricultural College. He had that institution now under his particular care—in fact, he regarded it in the way that a father looked upon his child, and as far as he was concerned, nothing would be left undone to make it worthy of the farmers of the country, for whose sons it was intended. It was the farmers' high school, and any young man who did not intend to follow a profession could obtain a more practical education at the Guelph Agricultural College than at any other educational institution in Canada. The Brockville *Recorder* gives the following summary and comment on the remainder of his address:

"Mr. Dryden's description of the routine at the College and farm was news to many present, and all certainly carried away better impressions of the farmers' school than they had previously entertained. The idea that a full and complete practical English education is given pupils attending the institution, in addition to the farm and dairy instruction, was a revelation to some of the listeners, who apparently had conceived the idea that all the boys learned was a little fancy farming, and white shirt, collar and cuff outdoor work. The fact is, as Mr. Dryden fully explained, that every detail of stock raising, farming,

dairying, care of stock, including the cure of their diseases, fruit growing, bee culture, etc., is taught in a manner to assist in developing the body as well as the mind, while the sciences, chemistry, botany, together with all that is necessary for the development of a successful farmer and an intelligent citizen, are in nowise neglected. It should not be forgotten that the Farm is not the College, neither is the College the Farm; but the latter is a most important adjunct of the former, and the young man who attends the College is kept at practical work every day on the farm, so that he loses no relish for agricultural pursuits during his school term, as he apt to do when attending the ordinary institute or college. Mr. Dryden defended the College against the attacks that had been made upon it by politicians, and declared that the farmers' boys should have as good an institution in which to fit themselves for their honorable calling as could be procured. It had been charged that the College did not pay, but, he asked, "was it ever charged that a Collegiate Institute did not pay?" No one expected the College to give a return in cash, but the money spent on it is well spent, and the great good being accomplished will more than compensate for all the money spent. Mr. Dryden claimed that the graduates of the Guelph Agricultural College are making their mark all over the Province and the advancement made in agricultural methods is evidence of the influence they are exerting in the localities in which they reside. The politicians seem to have grown a trifle ashamed of the criticisms that have been made against the farmers' school, and they have found that such criticisms have only recoiled upon those who have made them."

## REPORT OF INSTRUCTOR BENSLEY.

I have much pleasure in submitting to this Association my fourth annual report of work done in the district allotted to me, viz., Addington, Lennox and Frontenac.

The names of factories and the number of visits each received are as follows:

| | | |
|---|---|---|
| Palace Road.....3 | Hartington.....1 | Bell Rock .....3 |
| Newburg.....3 | Moscow .....3 | Enterprise .....5 |
| Centreville .....5 | Whitman Creek.....3 | Sheffield .....3 |
| Tamworth .....3 | Clare View.....2 | Moneymore .....2 |
| Camden East.....3 | Albert .....2 | Bath.....1 |
| Farmers' Friend.....3 | Conway .....2 | Selby .....2 |
| Glenvale .....2 | Forest Mills.....2 | Maple Leaf .....2 |
| Forest .....2 | Keenan & Son.....2 | Leo Lake .....2 |
| Union .....2 | Pine Hill .....2 | Rose Hill .....2 |
| Cataraqui .....2 | Pine Grove.....2 | Thousand Island .....1 |
| Gilt Edge .....2 | Howe Island.....1 | Granite Hill.....1 |
| St. Lawrence.....2 | Morning Star.....1 | Sydenham .....2 |
| Wolfe Island .....2 | Model .....2 | Hinchinbrook .....1 |
| Ontario .....1 | Tichborne .....1 | Fish Creek.....1 |
| Silver Springs .....1 | Harlowe .....1 | Crow Lake.....1 |
| Arigan.....2 | Long Lake.....1 | Wagarville.....1 |
| Cold Springs .....2 | Sharbot Lake .....1 | Oso .....1 |
| Inverary .....2 | Verona .....1 | Perth Road .....1 |
| Railton .....2 | Bear Creek.....2 | Battersea.....2 |
| Harrowsmith.....2 | Excelsior.....2 | Sand Hill .....2 |
| Sunbury .....2 | Napanee .....1 | Croyden .....1 |
| Excelsior.....2 | Union .....1 | Central .....1 |
| North Shore.....1 | Platt.....1 | |

In accomplishing this work 125 days were spent in testing and instructing, 18 in travelling, attending court and cheese boards.

The amount contributed by factorymen for my services was $400. The amount received in fines $95. Total $495. Number of samples of milk tested by Babcock tester 5,331, and by lactometer test 8,572. Of these samples I found but fifteen wrong, in all of which cases the owners where fined. Ten of these settled with me, and five I was obliged to prosecute. They were all convicted and paid their fines, except one who refused to pay and was committed to jail for thirty days.

Regarding the cheese in my district, notwithstanding the difficult season for making, I found a marked improvement in the goods, and the majority of makers more careful and painstaking than in former years. Of course there were some few still following in the old groove, and I suppose there always will be. One great difficulty the makers had to contend with was inferior rennet, which is too bad. In several factories I had to use eleven ounces of rennet to a 1,000 lbs. of milk to have the desired effect. Of course an old experienced maker would soon overcome the difficulty, but young inexperienced makers it would throw off badly. The makers this coming season should use nothing but first-class furnishings. Another thing makers had to contend with, and not a new thing by any means, is the negligence and slovenliness of the patrons in milking and the care of it afterwards. It is shameful the condition in which the milk comes to the factories—in many cases not even strained. It is astonishing, after all that has been said and printed, that people will still persist in their carelessness in the care of milk. In conclusion I would advise patrons to try and do their part, as I find the majority of makers doing their part well under existing circumstances.

All of which is respectfully submitted.

G. H. Bensley.

## REPORT OF INSTRUCTOR PURVIS.

I herewith submit my fourth annual report of work done as your dairy inspector. I commenced work on the 7th of May, and quit on the 3rd day of November, working in all 130 days. I visited 61 different cheese factories, giving from one to four visits to each, making ninety-four visits in all. Of the 5,300 samples tested by me, I found twenty-three which had been tampered with; a far less number than in former years, thanks to the fear of detection which is being instilled into the patrons owing to the proper use of the "Babcock" milk tester. These twenty-three parties, with the exception of four, settled with the managers of the factories to which milk was sent. I settled with two myself, and the other two refusing to settle with me, I had them brought before a magistrate, when they pleaded guilty and paid fines of five dollars each.

I found the makers anxious for instruction and willing to learn. The chief trouble during the past season has been caused by the makers maturing the milk too much before setting the vat, and keeping the curd too warm after draining, and I found it sometimes very difficult to convince them of their errors; but generally they have adopted my plan and have greatly improved their goods by doing so.

In October, I had a school of instruction at Alfred cheese factory, which was attended by seventeen cheese makers, when a very profitable day was spent, and a good lesson on fall cheese making was given.

The following are factories visited by me during the season, for the purpose of giving instruction and inspecting the milk received; also the number of visits to each:

| | | |
|---|---|---|
| Goldfield, No. 7 ..... 2 | Mongenais ..... 1 | South Branch ..... 1 |
| Cornwall Centre ..... 2 | Union Valley ..... 1 | Archer ..... 1 |
| Kendricks ..... 3 | Chard ..... 1 | Spring Creek ..... 1 |
| Tid Bits, No. 1 ..... 3 | Russell, No. 5 ..... 2 | Ottawa Valley ..... 1 |
| McLean's ..... 1 | Piperville ..... 1 | Caledonia ..... 1 |
| St. Isidore ..... 1 | Ste. Anne ..... 2 | Ethier's ..... 1 |
| Climax, No. 1 ..... 1 | Curran ..... 1 | The Brook ..... 3 |
| Apple Bee, No. 1 ..... 4 | Leroux ..... 1 | Elm Street ..... 1 |
| J. C. MacAlpin's ..... 3 | Siloam ..... 1 | Mille Roches ..... 1 |
| Goldfield, No. 5 ..... 2 | Elma ..... 2 | Balmoral ..... 1 |
| Osgoode, No 1 ..... 1 | Baltic Corners ..... 1 | Empire B ..... 1 |
| Morewood Union ..... 1 | Chesterville ..... 3 | Wendover, No. 2 ..... 1 |
| Metcalfe ..... 1 | Denison's ..... 2 | Green Bank ..... 1 |
| Nation River ..... 2 | Tid Bits, No. 2 ..... 3 | St Amour ..... 1 |
| Elm Grove, No. 1 ..... 1 | Lorraine ..... 1 | Aberdeen, No. 1 ..... 1 |
| Alfred ..... 1 | Routhier ..... 2 | Elm Grove, No. 4 ..... 1 |
| Pendleton, No. 1 ..... 2 | Maple Leaf, No. 6 ..... 2 | Alfred "Farrell" ..... 1 |
| Russell, No. 4 ..... 1 | Wyman's ..... 2 | Maple Ridge ..... 2 |
| Maxville ..... 1 | Farmers' Joy ..... 3 | Newington ..... 1 |
| Rose & Co., No. 2 ..... 1 | Embrun ..... 2 | |
| Alexandria Union ..... 1 | North Osgoode ..... 3 | |

Making in all sixty-one factories visited and ninety-four visits.

I had the pleasure of visiting several makers who attended the Kingston Dairy School, and must say a good deal of credit is due that institution, as I see a very marked improvement in their cheese over that of last year, and I found all the School students more anxious to learn than those who did not attend.

I have strongly urged on the makers the advisability of attending, and think that there will be a large attendance from this district this winter.

All of which is respectfully submitted.

A. P. Purvis.

Mr. J. H. Rupert: What do you think is too high a temperature for cooling curd?

Mr. Purvis: I want the temperature at 98° when I draw the whey, and if I can control the temperature so that I can have it gradually cool down to 92° for milling in two and a half or three hours, I think I have it right. I have found some makers steam the curd after milling, which I think is a great mistake.

## REPORT OF INSTRUCTOR HOWEY.

In submitting to this association my first annual report of the work accomplished in the district allotted me for the season of 1896, Belleville and Tweed section, I have to say that I was not notified to commence my duties till the season was half expired. In accomplishing this work of 82 days, 54 were taken up in giving instruction and testing milk; the remaining time was spent in travelling, settling milk cases, detained by rain and attending cheese boards. Of the 2,297 samples tested, nineteen were found to have been tampered with; from fifteen of this number, I received $205 for sending deteriorated milk; the remaining four cases were dealt with by the directors of factories. The amount contributed for instruction and inspection was $101.50.

In conclusion, I am sorry to say, I found there was a great need of instruction, the principal fault being the great loss of fat and the majority of makers not using sufficient rennet. I might say, if we are to retain the proud position we hold to-day as a cheese-producing country, the farmers must come to the aid of the cheese-maker by having their milk delivered at the factory in better condition.

Hugh Howey.

Mr. Howard Bissell: Things are improving since I was an inspector. I used to have to fine nineteen persons in a factory; now you have had only nineteen persons fined out of sixty-two factories. (Laughter.)

Major Redmond: What do you mean by "taking better care of your milk?" A good deal has been said about aerating milk. Farmers have been educated to aerate milk. Is there not a danger of aerating it too much? Can you also inform us whether it is better to have a large quantity in the can or a small quantity?

Mr. Howey: In the first place, I would say, have a nice clean place for milking, and the pail should be thoroughly cleaned. Have an aerator. The milk can should be clean and cool, and the place where the aeration takes place should be free from bad odors. If the milk is cooled down to the temperature of the air, that will be sufficient. The best cheese is made from the night's milk delivered in the morning. I prefer using the aerator to dipping. Too many patrons have so much milk that they cannot dip properly in the morning. It is as necessary to aerate the night's milk as the morning's.

Mr. Alexander: Do you ever come across any cases of bad flavored cheese except from bad rennet?

Mr. Howey: All the rennet I came across was good in flavor. I came across one place where they were using bad water with the rennet. The leakage from the factories was going into the well, and at that place I found the poorest flavored cheese.

Mr. ALEXANDER (Montreal): In the Province of Quebec there has been a great hubbub against rennet. Tens of thousands of dollars have been lost there on account of bad rennet. The Butter and Cheese Association took the matter up, but it was a hard thing to deal with. I am a cheese buyer, and handle all the cheese made in a certain factory. They made a very firm, dryish kind of a curd, which seemed to be cooked too high. There was no bad flavor from the cheese then, but in the later shipments, when there was more moisture in the curd, a bad flavor developed with the maturing.

Mr. HOWEY: It must have been the fault of the rennet; some people keep it too long

## REPORT OF INSTRUCTOR PUBLOW.

I have much pleasure in submitting the eighth annual report as instructor and inspector of this Association for the district lying between Kingston and Ottawa.

The applications this year were about the same as in 1895, but as there was no assistant only about two-thirds could be overtaken. As I have said in a previous report the territory is much too great for any one man to cover satisfactorily or with justice to himself.

The factories seemingly most in need were first visited, and in all eighty-one factories received one hundred and fifty-two visits as follows:

| | | | | | |
|---|---|---|---|---|---|
| Elgin Model | 1 | Plum Hollow | 1 | Forfar | 3 |
| Grand Central | 3 | Philipsville | 2 | Ontario | 3 |
| Smith's Falls | 2 | Bedford Mills | 3 | Stanleyville | 3 |
| Model | 3 | Centreville | 3 | Elm Grove | 3 |
| North Shore | 3 | Lake View | 1 | Mountain View | 1 |
| Ardmore | 2 | Salem | 2 | Westport | 2 |
| Fermoy | 2 | Clear Lake | 1 | Portland | 1 |
| Rockdale | 1 | Lombardy | 3 | D. & E. | 3 |
| Clear Spring | 3 | Sand Bay | 1 | Star | 1 |
| North Star | 1 | Island City No. 2 | 1 | Addison | 1 |
| Island City | 1 | Tay Banks | 3 | Valley Queen | 2 |
| Standard | 1 | Brookside | 1 | Elphin | 1 |
| Tayside | 1 | Drummond | 3 | Middleville | 3 |
| Dalhousie | 3 | Clayton | 3 | Rideau Queen | 2 |
| Lanark and Darling | 3 | Maple Leaf | 2 | Fairplay | 1 |
| I. X. L. | 1 | Clareview | 3 | Goodstown | 1 |
| Beckwith | 1 | Zealand | 1 | Maberly | 1 |
| Ashton Union | 1 | Mississippi | 4 | Clyde | 1 |
| Riverside | 4 | Bathurst Mutual | 1 | Poland | 1 |
| Fallbrook | 3 | Waba | 2 | Prospect | 1 |
| Tennyson | 2 | B. C. T. | 1 | Twin Elm | 1 |
| Harper's Corners | 2 | Glen Elm | 2 | Robinson's Mills | 1 |
| Bell's Corners | 1 | Boyd's | 1 | Watson's Corners | 1 |
| Hopetown | 1 | North Osgoode | 1 | O'Keefe | 1 |
| North Gower | 1 | Elginburg | 1 | Manotick | 3 |
| Tamworth | 1 | McCalpin's | 1 | Carsonby | 2 |
| Bonnechere Valley | 1 | Bellamy's Mills | 1 | S. L | 1 |
| Frankville | 1 | Ardoch | 2 | | |

Of the 160 days in the employ of the Association, 146 were spent in visiting factories and giving instruction and testing milk, three in settling milk cases, three attending cheese boards, six travelling to factories, and two inspecting rejected cheese.

Of the 8,508 samples of milk tested with the Babcock test and Quevenne lactometer 38 were found to have been tampered with, and of these 27 were fined $605, and the remainder let off with a warning on their representing the matter as having occurred without their knowledge.

The amount of fines netted by the Association was $278.50; the amount contributed by factories for my services was $530, making a total to the Association of $808.50.

In the fines noted above, $15 are included as the Association's share of a fine imposed in 1895, but which, on account of an appeal being made, was not settled at the time of the last annual meeting.

The decision was in the first trial in the favor of the Association, but the defendant had the case carried to the High Court at Toronto. It was in the Association's interest to follow it up, and although the costs are to the amount of $135, yet the victory is ours, and I believe the result will be a benefit to the Association to a far greater extent in the years to come. Had this final decision been given earlier in the season there would have been more prosecutions, but as this was a test case I thought it better to await results.

Under existing circumstances this work of inspection is necessary, but very disagreeable. We will hail with delight the day when the law will require that milk be paid for according to quality, and so relieve the Association of what is now a disagreeable duty.

Throughout the whole district the work done by makers this year is more satisfactory than usual. On the whole they seem more alive to their business, and to realize that they must be up to date with their work if they would not be replaced by others. Notwithstanding that there is no excuse whatever for any cheese-maker not having a thorough knowledge of his business, there are still those who are lacking. Some seem to be quite satisfied with a general knowledge of cheese making, and are not able to give the "why or wherefore" of much that they undertake, which accounts largely for the many irregularities in the make-up of their cheese. It is absolutely necessary that makers be more particular as to the condition of the milk they accept.

A number of causes why the cheese is not fine might be dealt with, such as imperfect milk and how caused, lack of knowledge in manufacture, carelessness on the part of the maker in putting into practice the knowledge he has, facilities for curing and shipping; but it would make this report quite too lengthy to enter into details, especially as these points are likely to be generally discussed later on.

In conclusion I would thank the Association and dairymen for all the kindness and courtesy extended to me throughout the season.

All of which is respectfully submitted.

G. G. PUBLOW

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Major REDMOND: Did you fine those delinquents under the Babcock test?

Mr. PUBLOW: By the Babcock tester and the Quevenne lactometer.

Major REDMOND: At what stage do you come to the conclusion that the milk has been tampered with?

Mr. PUBLOW: I am generally convinced before the test is applied.

Major REDMOND: What do you do in a case where all the members of the family swear that the milk is all right?

Mr. PUBLOW: I go largely by the tester, and the courts generally decide in my favor. Milk may be low in fat and yet be untampered. If cows are a long time milking, they will give more than three per cent. fat in the milk.

Mr. R. G. MURPHY: Is it not a fact that milk may show three per cent. fat and be adulterated, and another milk may show three per cent. and be all right?

Mr. PUBLOW: Exactly. I do not go by the Babcock test alone. One must also consider the specific gravity of the milk. In one case last summer the milk tested only two per cent. of fat, and half of it was water as was shown by the specific gravity. I tried milk direct from that cow with the Babcock test, and it showed four per cent. of fat, and was a marked difference also in the specific gravity. That proved that the milk had been tampered with. I have known milk to test three per cent. of fat and be watered; and I have seen milk test 2.8 per cent. fat and be pure milk. The best way to prove the genuineness of the milk is to go and examine it as taken from the cow. I find that too many patrons are keeping the strippings at home. I believe that the law of this country should say that milk must be paid for according to quality at the factory. Makers are

afraid to press this matter, but the Government should insist upon this point. You would not need to fine people then. You would get better milk, and that would mean better cheese. Inspectors have enough to do without running around fining people.

Mr. CRANSTON. A great many makers in the county of Frontenac last season were using rennet that took from twelve to sixteen ounces to thicken the milk in thirty minutes.

Mr. PUBLOW: That is one of the causes of so much poor cheese—the milk is overripe when it comes to the factory and sufficient is not used. If I had rennet of such strength that I would have to use eight ounces, I would not use it at all. Where you have to use so much rennet, it is a sign that is decayed. The less rennet you can do the work with the better.

Mr. AYRE: The conclusion we at Montreal came to about rennet is that it commences to deteriorate in a very short time after it is produced. Like butter, it is best when fresh. The best rennet ever made would not be as good when a year old as now. It would not be equal in strength, although it might be still good in quality, and therefore you would have to use more of it. We also concluded that if rennet is kept at a high temperature, or exposed to air, it deteriorated very rapidly both in quality and in quantity.

Mr. PUBLOW: I believe that you can preserve rennet for a long time if you keep it at a low temperature. Rennet should be put up in bottles only. It it is not advisable to put it up in barrels as the air will get into them no matter how you try to exclude it, and the barrel will soon get stinking. If you do get it in kegs, do not make any vent hole, but let the rennet run slowly rather than let the air in.

Mr. AYRE: We also came to the conclusion that it was safe to buy the rennet in barrels in cold weather, and then place in bottles for the warmer weather.

Mr. ALEXANDER: I suppose you have met makers who use four ounces of rennet, and in that same factory, and with that same rennet, you yourself have used only two ounces?

Mr. PUBLOW: I cannot say I have used two ounces in such cases, but I have done it with three ounces.

Mr. ALEXANDER: I know a case where the maker used fifteen ounces and the inspector also used fifteen ounces. Another person came along and used only three ounces, and the maker thereafter used only three ounces. A good deal depends upon who condemns the rennet. If Mr. Publow condemned rennet, I would say that that rennet was ruined, but if Tom, Dick or Harry or the average cheese-maker condemned it, I would not too readily accept their verdict.

Mr. MURPHY: If we have ignorant cheese-makers to-day there is little excuse for them.

Mr. HOWARD BISSELL: Is not this yellow cheese the result of the pasturage in June?

Mr. PUBLOW: Yes, to a considerable extent. The dandelions have something to do with it. The remedy is to let the acid come upon the curd a little more tenderly, and drop the temperature one, or perhaps two, degrees. I would not ripen the milk more; set the milk earlier, but at a lower temperature. I believe that 97° is high enough for spring milk. What we want to make is a soft, silky cheese, with a cream flavor. It does not pay to hold spring cheese long; cheese of a sweet, nutty flavor brings the highest price. And where are we to get that precise flavor but from pure sweet milk? and if we ripen milk too much, that exquisite flavor is destroyed. If we want a sweet flavored cheese we must have the curd cooked before the acid is too fully developed. In the spring, cook lower, and set so that the moisture will be well expelled.

Mr. AYRE: The fact was brought out yesterday that the market requires a fatter cheese. What do you think of that opinion

Mr. PUBLOW: I think there is sufficient fat in our cheese, if we will only make them more mellow by a little more moisture. I find that two often the milk is overripe. We have talked ærating milk until it has been almost overdone. Milk must be cooled in

hot weather. We must keep it at the temperature of the atmosphere, and sometimes lower. If milk is set at a temperature of 80°, and kept at that all night, it will be too ripe to make cheese at eight o'clock next morning. I would rather wait a half hour for the milk to ripen, than have the milk ahead of me. (Applause.) Makers should send any overripe milk home. By so doing patrons will soon become educated to the point of carefully cooling the milk, and thus keeping it from becoming overripe. Milk should be cooled to 75°, and it will be better still if cooled to 60°. If the atmosphere is above the temperature of the milk, I would put a cover on the milk can. The milk should be ærated before cooling. If the night's milk has been cooled, and is nice and sweet, it will be all right for mixing with the morning's milk. Putting the morning's milk in under such circumstances, is simply raising the temperature of the night's milk, and starts the fermentation more quickly. If you cool the morning's milk to the temperature of the night's milk it will pass.

For testing ripeness of milk, put a dram of rennet in eight ounces of milk and stir for ten seconds. Coagulation should take place in fifteen to twenty seconds. This can be determined by dropping in a piece of cork or burnt match or a little light, dry dust. There is a more exact test known as the Marshall rennet test, which measures the rennet to a half drop, and shows the measurements in a graduated glass tube.

Mr. Halliday: Some makers have had trouble with gassy curd. The curd develops a gas before there is sufficient acid for grinding.

Mr. Publow: About three years ago gassy curd was brought to our attention, but it was not very general; now it is very common. I do not know what is the cause of it; that is a good question for chemists to examine into. I believe it is a fermentation of some kind, and I also think that if we were to cool our milk properly we would not be so badly troubled with it. The best way to handle that curd is to cook it more thoroughly and develop a little more acid so as to have it come with a single piling, and then salt and mill as soon as possible. Let it mature at 90° rather than 96°, so that it will mill at 80°, and if possible at 70°, before going to the hoop. Get the curd well cooked before developing acid; develop the acid on the curd.

Mr. Halliday: Have you ever tried leaving off your vat covers?

Mr. Publow: Leave off your covers altogether. Too frequently the temperature is too high.

Mr. Halliday: There is a possibility of making a speckled cheese by having the curd exposed to the air too long without being turned.

Mr. Publow: You will get a speckled cheese if you do not turn often enough. The whey contains sugar, and that brings on the acid; and if some of the curd remains too long in the whey, spotted or speckled cheese will result. I do not think, however that this is what causes red spot. I believe that the oftener the cheese is turned the more uniform it will be in color. It makes a little more work, of course, but it means more money in the fall. Always test your milk for ripeness. If the milk shows fifteen seconds by the rennet test, that shows me that it is likely to work in two and a half hours. If it takes only ten seconds by the rennet test, then I know I have a fast working milk, and must act accordingly. I would use more rennet with a fast working curd, and would cut more finely. The more rennet you use, the more moisture will be retained in the cheese; and while it will make a harder cheese at first, it will be a better article in the end. Much salt and long stirring or cooking will expel moisture. You must retain a fair amount of moisture in order to have a good cheese.

Mr. A. Cranston: Does the richness of the milk affect the amount of rennet that should be used?

Mr. Publow: If we have very rich milk, we have more fat in the cheese, and more fat means a softer cheese. If we have milk deficient in fat, we use more rennet to make the cheese retain more moisture to replace the fat.

Mr. Ayre: Who is responsible for flavor?

Mr. PUBLOW: I may say here that bad flavored curd, as a rule, originates with the producer of the milk.

Mr. AYRE: I never could understand why the maker should be charged for the flavor of the milk. (Loud applause.)

Mr. PUBLOW: Regarding bad flavors in cheese, I would say that you will have to see the cheese before deciding upon the cause. Bad flavors originate from various causes, but the commonest cause is filthiness in the home dairy. Bad water or food will generate what are known as food flavors; but these particular flavors can be aired out to a great extent, and buyers would be likely to pass the cheese made from such milk. But with a bad milk flavor—one that gets its odor from the surroundings—the longer you have it the worse it stinks. Manure is worth more in corn growing than in flavoring curds. (Laughter and applause.) The remedy for foul milk lies largely with the patrons. Too many farmers do not properly strain the milk. An inspection of the milk strainer would surprise many. However, even the strainer will not keep out the flavor of foul matters which have got into the milk, and have been long afterwards strained out.

Mr. WADE: I have often noticed women dipping their fingers in the milk for moistening.

Mr. PUBLOW: Yes, and the dirtier the cow's teats the oftener she will dip her fingers in the milk. It too often happens that cows are milked in the stable yards, and the cans are also placed there. What is the reason we have so much bad flavored milk in a damp, sultry time? It comes from the ground, and floating in the atmosphere, falls into the milk, and straining can do little to improve such milk. Aerating milk in such a locality is doing more harm than good. Only pure air can benefit milk. If I have a bad curd, I must use good, pure water, which will clean the curd, just as one would wash a dirty dish cloth. If too much acid is developed, the texture of the cheese will be destroyed. Some makers advocate washing the curd when the whey is drawn off. If I had a bad flavored curd, and knew the milk was rapid, I would draw it as soon as I could. I would cook it as quickly as possible. Use clean, warm water, at a temperature of say 98° or 100°. I would draw the whey off close down to the curd. There is a danger then, however, in not having the curd uniform. If you do it after milling the curd, the curd is more uniform in size, and there will be a more evenly flavored cheese. The maker should use his note book wisely.

Mr. WHITTON: Is it not almost impossible for the cheese-maker to properly taste bad flavored milk while it is cold?

Mr. PUBLOW: Yes. I suggested last year that every maker should visit his patrons, and thus he would soon be able to keep better track of the bad flavor.

Mr. AYRE: I would save a sample of every patron's milk.

Mr. PUBLOW: If you can detect milk with a bad odor save it for the patron to smell; when it gets old it will smell badly.

Mr. DARGAVEL: We had a case this year. Our maker found some milk which was considered by him off flavor. Mr. Publow examined it, and put in writing a statement that it was impossible for any man to make good cheese from that milk. Next day I told the patrons that the day before we had a loss of $42, and that they must make it up. Then there was war. (Laughter.) I said that so long as it was not the fault of the cheese-maker, I would not have him lose it, and I was not going to lose it myself. A few days afterwards one of the largest patrons came to me and said: "Do you mean to say that we have to lose that $42?" I said, "Yes; and if you want to test the case, just bring suit against me." He said, "Then you will not get my milk next year." I said, "You may do as you please regarding that." Just as soon as the patrons found that the money was coming out of their pockets, instead of that of the cheese-maker, there was a wonderful difference in the quality of the milk. So long as we, as makers or owners, take poor milk from the patrons, and suffer the loss ourselves, so long will they permit this drawback to first class cheesemaking to go on. The easiest way to reach patrons—and toreach most of us—is through the pocket.

Mr. PUBLOW: Of course we may have a bad flavored milk, and the fault may not be that of the patron. The maker should leave nothing undone to prevent any loss through his own neglect. He should use good rennet and pure water, and have everything scrupulously clean about the factory. If he has done all that and has a bad curd, he may safely look to the milk and its producers. He should save a sample of every patron's milk, and thus he would soon get to the bottom of any trouble with his cheese. Put, as I have already hinted, he should first begin with himself. He should compare the flavors of the milk with the flavors of the curd. He should also put a drop of rennet in each sample of milk, and thus get curd for closer comparison.

Mr. AYRE: We have two flavors in Montreal that we give to cheese: One is called "stinking whey" flavor, and the other is termed "brewery" or "pineapple" flavor.

Mr. PUBLOW: The whey flavor is caused by the milk working overripe. I believe we can make fine cheese where the whey goes back in the cans, if the whey tank were only kept properly clean.

Mr. HOWARD BISSELL: Many cheese are ruined by a bad starter.

Mr. PUBLOW: My attention was called to the fact that at a certain factory milk had been rejected on account of bad flavor. The cause was that the maker had been keeping the milk over, and had put it in the whey cans until through the day's work, when it was run into the vat and let stay there during the night. The tinning was off the bottom of the vat, to a great extent, exposing much of the iron, and from that cause the milk took a bad flavor, which was very objectionable indeed. Do not keep milk where the tinning is worn off the vessel. No maker should sign an agreement to make first-class cheese unless he is provided with a first-class outfit, or is willing to risk the loss. It pays all concerned to have proper apparatus in cheesemaking.

Mr. EAGER: This has been a very practical and profitable discussion. I was talking with a farmer this morning and he remarked that everything comes from the farmer, and nearly all the blame is placed upon him. He is blamed for the flavor of the milk; he is blamed for sending poor milk, for not taking proper care of his cows, etc. It is easy to complain. It does not take much to make a man grumble, but he is a different sort of a chap who will provide a remedy. I suppose 90 per cent. of the factories are not paying for milk according to quality. It is not consistent to talk about dishonesty when we are practising the dishonest system of paying for milk regardless of quality.

Mr. EVERETS: Mr. Eager says that the manufacturers start off wrong in not paying according to quality. But manufacturers are only the servants of the patrons after all. I know of factories where the farmers have been paid by the Babcock test, but they refused to have that plan the following year. It is not for me or for any other man to dictate to the patrons how they shall be paid for their milk. It is for the producers to say whether or not they shall be paid by the Babcock test.

Mr. HOARD: May not the system be dishonest after all? The farmer may be wrong; he is wrong often. I have been wrong myself. This appears to me to be a matter of education and evolution, and the exercise of a little backbone on the part of the man who handles the factory. I have gone through the conflict, and I know what it means. It took a keen, steady, determined action—the hand of steel in the velvet glove—to hold 800 men so that they should do right by one another. That equation of human selfishness will come in every time; and the good men who furnish the better milk will too often allow themselves to be robbed by the men who have inferior milk. The division of skim-milk has often caused a good deal of trouble. Many men cry out for co-operative factories and creameries when they cannot co-operate in the division of skim-milk. Here you are establishing principles; out yonder you are establishing practices. Let us never forget that twice two does not make five, but always four; no more and no less. This Babcock test is not an absolutely perfect test. No test, or scale, or rule on earth ever was perfect. There is nothing perfect short of God. In order to see that our patrons had their just due in regard to skim-milk, we put in a skim-milk weigher, a sort of slot machine. A metal check was given to each patron, which entitled him to receive so much

skim-milk. He dropped his check into the scale and got so much milk. We have had to do a little more than we are paid for in order to get paid for what we do. (Laughter.)

Mr. AYRE: I think the matter has been laid down very clearly by Mr. Hoard. This gospel of fair dealing should be preached to every patron, and if done wisely, the farmers will soon do the right from conviction and not because they are forced.

Mr. JAMES WHITTON: I think the cheese-makers of the Belleville district are about the best posted men in the country. They are held responsible for the very highest price given. One of our young cheese makers was sent back to the northern part of the country, and when his cheese came to be marketed it was bad. I was interested in the young fellow, for he was a mere lad, and looked up the matter. I found that the cheese-factory was built near a small lake, and there was a large hog establishment there. The neighbors' hogs also came around, and so a lot of hog manure was run into the lake. That was the only water that young maker was provided with. I asked the directors if they had not good water in the neighborhood. They said there was a good spring about three-quarters of a mile away. I asked them to get the patrons to bring in some water, and next day they brought in a gallon or so. When the fall came they gave that young fellow only a dollar. They refused to give him another cent. I said, "Then he will sue you." We fought the case out at Belleville, and that boy got every dollar that he claimed. If it is the patron's fault or the owner's fault, the maker should not be blamed.

Mr. DARGAVEL: I am of opinion that oftentimes the bad flavor in milk comes from the bad water the cows drink, and this often arises from sluggish streams running through the farms. I think it is a misfortune for a farmer to have such a stream running through his property.

Mr. PUBLOW: I am glad Mr. Dargavel brought that point up. That was the cause of some bad flavored cheese in his factory. His maker was a good man at the business, but some of the cows drank at a sluggish stream, and that spoilt the milk for cheese-making. The fault was not with the maker, but with the water drank by certain cows.

## ELECTION OF OFFICERS.

The report of the nominating committee was read at the afternoon session of the third day, and on motion of Mr. Wm. Eager, seconded by Mr. James Whitton, it was unanimously adopted. The list of officers will be found in the Appendix.

The officers so elected were by agreement to be the officers of the Butter and Cheese Association of Eastern Ontario for 1897.

## AUDITORS' REPORT.

The financial statement, duly signed by the auditors, was read, and on motion of Mr. MORDEN BIRD, seconded by Mr. T. B. CARLAW, it was adopted unanimously. This report will be found in the Appendix.

## REPORT OF INSTRUCTOR GRANT.

I herewith submit my third report of work done for the Association. Below is a list of factories visited. One hundred and seventeen days were spent in visiting factories, three attending cheese boards, one settling cases, six travelling, and three delayed on account of rain, making a total of 130 days in the employ of the Association.

I tested 6,290 samples with Quevenne lactometer and 3,600 with Babcock tester. Of this number forty were found to be deteriorated. In nearly all cases the factorymen preferred to settle the matter among themselves.

Amount received from factorymen, $315 ; from fines, $110.25 ; total, $425.25.

Following are the number of times factories were visited :

| | | | | | |
|---|---|---|---|---|---|
| Madoc | 2 | I. X. L | 2 | Maple Leaf | 3 |
| Alexandra | 2 | Seymour, West | 2 | Rogers' | 2 |
| Queensboro' | 2 | Stanwood | 2 | Queen's' | 2 |
| Eclipse | 2 | Riverside | 2 | Foxboro | 2 |
| Frankford | 2 | Ryleston | 2 | Enterprise | 2 |
| Cold Springs | 2 | Melrose Abbey | 2 | Spry | 2 |
| Millbridge | 2 | Trent Bridge | 1 | Monarch | 2 |
| Oak Leaf | 2 | Shearer | 3 | Norham | 2 |
| Silver | 2 | Westwood | 3 | Land | 2 |
| Brook Valley | 2 | Daisy D | 3 | Sutton | 3 |
| Spring Creek | 2 | Woodland | 2 | Missing Link | 2 |
| Deloro | 2 | Shamrock | 2 | Mt. Pleasant | 2 |
| Spring Hill | 2 | Roseneath | 2 | Bensfort | 2 |
| Marble Creek | 2 | Warkworth | 2 | Cedardale | 1 |
| Bell | 2 | Beaver | 2 | Young's Point | 1 |
| Marmora | 2 | Myersburg | 2 | Moira | 2 |
| Cooks' | 2 | Valley | 2 | Castleton | 2 |
| Crow Bay | 2 | Empire | 2 | White Lake | 2 |
| R. Lake | 3 | Union | 3 | | |

All of which is respectfully submitted.

W. W. Grant.

A Member : Do any factories in your district pay according to the Babcock system ?

Mr. Grant : Five or six factories only have been paying according to the amount of butter-fat in the milk. We had a good deal of trouble at one time this season on account of the milk being overripe and the makers using too much of a starter.

Mr. Cranston : How often do you save milk for the Babcock test ?

Mr. Grant : Some once a week and some twice a week. We use bichromate of potassium. In summer time it is best to test twice a week. It is hard to get patrons to be thoroughly satisfied with the Babcock test. Regarding greasy curds I may say that in the northern section the milk is very rich and the curds are very greasy, and it is therefore hard to make cheese that has not an excessive amount of grease in it. I have found that where the milk tests very high by the Babcock the chances are that the cheese will not be extra, on account of too much fat being there. Some patrons in my district thought the Babcock test was not fair, but I do not think there is any reason for that opinion. Makers find, however, that under the Babcock test the milk generally comes in better condition than formerly. In handling very rich milk I would endeavor to have it sweeter, cook it a little higher, and stir it a little oftener. I would not allow as much acid for rich milk as in the case of poor milk. Use more rennet with rich milk. Some makers are too much afraid to use rennet. I think a starter is all right when used judiciously, but it is not wise or profitable to use too much of it. Some use 100 pounds of starter in one vat, and that was too much. If you have gassy milk good sour milk might help it, just as that same sour milk would injure good, sweet milk. Fair cheese can be made from gassy curd, but of course it will not be as good cheese as that made from pure milk.

## INTRODUCTION OF PRESIDENT-ELECT DERBYSHIRE.

The retiring President, Mr. Henry Wade, then introduced his successor, Mr. D. Derbyshire, and thanked the association for its kindness and indulgence during the year he had the honor to preside over its affairs.

Mr. Derbyshire: I thank you heartily for the honor you have done me. I have filled this, or a similar position, before, and I then did the best I could to forward the dairy interests of the country. And now that new problems have arisen, and new work is to be done, I trust that in the directing of this Cheese and Butter Association I shall be able to do something for the cause of dairying in Canada. We must see to it that there is proper education given to all concerned—to the makers, to the patrons and to those who handle the product later on. I shall look with hope to a successful future for this Association and the interests which it represents. (Applause)

## EXPERIENCE WITH THE BABCOCK TESTER.

By Mr. Wm. Eager, Morrisburg.

Following is an impromptu address, given in response to frequent calls: Since 1893 I have been advocating and practising the use of the Babcock test in cheese factories, and I have had to fight the battle almost alone. In that year I commenced with one of my factories just to try and see how the thing would work. I was careful to get the very best man available to help me to put the work on an accurate basis—Mr. McEwan, now dairy agent for the New Zealand government. We called a meeting at this particular factory, and got as many patrons as possible to come, and then explained to them that our intention was to pay for the milk according to the amount of butter-fat. There were a great many dissentient voices. I said, "Well, let us try it for one month, and if the thing is wrong we can then drop it." I also told them that there was some expense connected with the test, and that they should pay me a little more for doing it. The majority decided to try the new plan, of paying according to the Babcock test, and I was to get fifty cents per patron for the extra work of conducting the test. It went on nicely for the first month, except that some of the farmers did not give proper attention to their milk. At the end of that time, however, there was trouble, as some of the men got 70 or 80 cents per hundred pounds of milk more than their neighbors. The great question in this connection is how to get hold of the slip-shod fellow, the man who does not care what or how the milk is so long as he can get it to the factory. But we kept pouring oil on the troubled waters, and patrons soon began to see that with a little more care and attention their milk would show a better test; and something was gained just there. We were getting the milk in an improved condition. It is hard to get a fair sample from poorly cared for milk, and that means a loss to the slip-shod patron. Under the old plan of pooling everybody else lost, but under the new system of paying according to quality the producer of such milk is the only one who loses. You have made a strong point when you show the people that they will lose if they are careless and gain if they are careful. There is no encouragement under the pooling system for the man who takes care of his cattle and milk. It is a vicious system; it is dishonest and unfair. The sooner every factory in this country pays for milk according to its relative value the sooner we will place the cheese trade upon its proper basis. There has been a good deal of talk at Ottawa about branding cheese, but if they would only say that milk must be paid for according to butter-fat it would lift up the business and the men engaged in it to a higher plane. People may say that three per cent. milk will make just about as much cheese as four per cent. milk. The average difference in readings of butter fat in my twenty-three factories was only about two-tenths of one per cent. In practical work we do not get great variation, and the longer you work by the Babcock test, and pay for milk according to its richness and actual value, the closer together the registering of fat becomes. The people become educated, and are bound to furnish good milk or lose money. Under the old plan it does not matter so long as the cow gives milk how low in fat the product might be.

Mr. Dargavel: Do you find the plan expensive now that you have got it

Mr. EAGER: With the number of factories I have I must keep a man on the road all the time looking after cheese-makers and inspecting and testing milk. I pay this man so much a week for testing. He tests each milk every two weeks. We never have any trouble even in the hot weather. In November, 1893, we took samples of milk and tested them as they came in and then put them away. In the month of March, fully four months later, we tested that milk again, and found that the two readings were exactly the same. There is no trouble in keeping milk for testing. I again assert that all milk should be paid for according to the amount of butter-fat in it. I have tried the plan since 1893, and every year we are making a little advancement. I am a sort of advance guard in the dairy army. The man who sends poor milk to a factory under the pooling system is getting his neighbor's money under false pretences. The commandment, "Thou shalt not steal," should be thundered in his ear continually.

Mr. JOHN NEILL: If one milk tests three per cent. and another four per cent., would the latter milk make one-third more cheese?

Mr. EAGER: No; but I repeat that we do not get that difference in practical work to-day. There is never that disparity. It is seldom more than one-fifth of one per cent. In the month of June it usually takes about eleven pounds of milk to make a pound of cheese, while in September nine pounds and a half or nine pounds and three quarters of milk will make a pound of cheese. Why does September milk make more cheese than June milk?

Mr. NEILL: Because it is richer.

Mr. EAGER: Exactly. The richer the milk the more cheese we can get from it. One farmer has milk that stands at 3.5 and another milk that shows only 3.1 per cent. butter-fat. Is it fair that the man who has the 3.5 per cent. milk should get only as much as the man who provides the 3.1 per cent. milk? We pay strictly according to the Babcock test; we neither add to it nor take away. We have enough already to contend with in the simple test. People are naturally inclined to say, "Why add two per cent.? You advocate a thing at one time and then try to change it." The Babcock tester put in the hands of a man who is competent to handle it will give satisfaction to honest men. Of course you cannot afford to hire a man to test for only one factory. Form syndicates for this purpose, just as they do in Quebec, and let one man take charge of twenty factories.

Mr. EVERTTS: You will recollect that at the convention held at Campbellford last year this question of paying by the test or by an addend came up. Prof. Dean there took the ground that in order to make the test fair to all concerned two per cent. should be added to the fat readings. The Dairy Commissioner opposed this, and, like Mr. Eager, advocated paying by the reading of the test without any alteration whatever; but neither then nor since has any proof been brought forward that Prof. Dean's position was not a sound and just one. Prof. Dean adds two per cent. to allow for casein—for casein is nearly as important a factor as fat in the composition of cheese. Mr. Eager says that he pays for the fat and not for the casein. There are cows to-day giving milk which is rich in casein while not rich in fat. Everything that goes to make solids in cheese should be paid for, whether determinable by the Babcock test or otherwise. I hold, therefore, that in order to make a fair distribution of the money the two per cent. of casein should be added. There is a "nigger on the fence" somewhere. We cannot and should not try to force the farmers to pay for milk by this proposed plan. If they say they will take their pay by the Babcock test, then I am ready to say, "Go ahead;" but we have no right to take them by the throat and say, "You must take your pay by the Babcock test." The question of the addition of two or three per cent. to the Babcock readings remains just where it was a year ago. The men who are doing the best work in our interests to-day are the inspectors. They are giving first-class instruction to our makers, and are doing much to build up the dairy trade of this Province. Regarding dating, branding, etc., the sooner we cease tinkering with our cheese industry in that respect the better. Then there is the matter of separators. You can go anywhere out around Brockville to-day and find men using separators. You can go to private dairies and find more butter

being made from 100 pounds of milk than is being made at the creameries. There are too many creameries and too many cheese factories in some quarters. There are many cheese factories for sale to day, and there will be more for sale next year. No man can afford to run a small factory nowadays. The little concern must go; it cannot successfully meet the keen competition of to day. In any event the maker should be paid a fair price. Use good material. Have a good cheese made, and put it up in neat, strong boxes, and present it in the best possible shape.

Mr. DERBYSHIRE: We are living in perilous times, and we must bestir ourselves to put the business on a sounder basis than exists at present. The farmers say they are making no money, and they are, therefore, inclined to grind the makers. The tendency of all the addresses given at this convention has been, first, you are to keep a better cow; secondly, this cow must be fed better, and thirdly, a better man is needed to select that cow and feed it. I agree with Governor Hoard when he called corn the "sheet anchor" of dairying. We had one man in Brockville section who a few years ago filled a silo with corn and fed his cows nothing else. That was not wise. No man would care to live on potatoes only. Cows require mixed feeding just as well as men do. Mixed feeding means enrichment of the land and enrichment of the pockets of the farmers. The cow should be kept in a place where she will be comfortable and at ease during the winter. You can never make money if you keep a cow that gives only 300 pounds of milk a year. You can get the proper kind of a cow only by judicious weeding and selection. Prof. Roberts, of Cornell, by selection got a cow that dropped a calf which gave him 12,000 pounds of milk in a year. A dairy cow should be a good feeder, but the food should be turned by her into the milk pail. Dairymen, like business men, should "take stock" from time to time and find out where they are weak and where they can improve. No business man can make money if he runs his business only six months in a year. Neither can the dairyman prosper who will have his cow working for only six months out of the twelve. I would urge every maker to go to the Dairy School, even if for only two or three days. Get acquainted with the patron and teach him that he has cows that can be improved, and that his utensils, etc, can be kept cleaner. The maker could do all this in such a way that the farmer would really love him (Laughter)

## REPORT OF COMMITTEE ON DAIRY UTENSILS.

The Committee reported as follows:

We, your Committee on Dairy Utensils, beg leave to report that we have examined the curd mill exhibited by Mr. Braithwaite, of Winchester, and consider it a first-class mill in every respect.

The butter boxes exhibited by Mr. D. M. Macpherson is a first-class article, and the Quinn refrigerator appears to be a good thing.

The Windsor salt we consider a first-class article and cheerfully recommend it to the consideration of the dairymen.

## VOTES OF THANKS.

Votes of thanks were then passed to the Chairman of the Local Committee (Mr. D Derbyshire) and the citizens of Brockville for the hospitality and general kindness shown to visitors to the city; to the retiring President for his courtesy and faithful service; also to the press and railways for favors extended.

The convention then adjourned.

# HISTORICAL SKETCH OF THE DAIRYMEN'S ASSOCIATION OF ONTARIO AND EASTERN DAIRYMEN'S ASSOCIATION.

By Henry Wade, President in 1896.

The first Canadian Dairymen's Association was organized in 1867 at the Town of Ingersoll, pursuant to a public notice sent to parties interested in cheese-making at that date. (Extract from paper of C. C. James, Deputy Minister of Agriculture.) The factory system of manufacturing cheese commenced in Oxford county in 1864 by Mr. Harvey Farrington, formerly from Herkimer Co., New York State. In 1866 the first factory was started in Hastings county by Mr. Ketchum Graham, and at the same time in Northumberland county by Mr. John Wade, and his son Henry Wade. During the years 1864 to 1867 there was a great development of the co-operative system of cheese-making in the east and west, and more particularly in the west. The want of information on the important subjects of cheese-making, as well as of the marketing the same, was the immediate cause of the formation of this Association. As the present writer was unfortunate enough to lose by fire the early reports of the Dairymen's Association, he has to be indebted to an article by Mr. J. W. Wheaton, Secretary of the Western Dairymen's Association, for extracts from the first report, as follows :

" Pursuant to public notice, an important meeting was held in the town hall, Ingersoll, on the 31st July and 1st of August, 1867, for the purpose of organizing a Dairyman's Convention and otherwise promoting the dairy business interest in the Dominion of Canada. Upwards of two hundred dairymen from various parts of the country were present, and the greatest interest was manifested in the proceedings. The convention was called to order soon after ten o'clock on the first day of meeting, and a temporary organization effected by the appointment of W. Niles, Esq., Nilestown, chairman, and Jas. Noxon, Esq., Ingersoll, secretary. A large committee on organization and general business was then appointed, after which the convention adjourned until half-past one.

The convention proceeded to consider the report of the organization committee which was unanimously adopted, and which read as follows :

Whereas it is deemed expedient to form a Canadian Dairymen's Association through which, as a medium, practical experience of dairymen may be gathered and disseminated among the dairy community, therefore be it

Resolved that we, the undersigned, do hereby associate ourselves together for mutal improvement in the science of cheese-making and more efficient action in promoting the general interests of the dairy community.

Article 1. The name of the organization shall be the " Canadian Dairyman's Association."

Article 2. The officers of the Association shall consist of a president, twenty vice-presidents, a secretary and treasurer.

Article 3. The president, vice-presidents, secretary and treasurer shall constitute the executive board of the Association, seven of whom shall form a quorum for the transaction of business.

Article 4. The officers of the Association shall be elected at each regular annual meeting and shall retain their offices until their successors are chosen.

Article 5. The regular annual meeting shall be held on the first Wednesday of February in each year and at such place as the executive board shall designate.

Article 6. Any person shall become a member of the Association and be entitled to all its benefits by the annual payment of $1.00.

The following officers were then elected : President, O. E. Chadwick, Ingersoll ; vice-presidents, M. H. Cochrane, Montreal ; Henry Wade, Port Hope ; T. H. Wilmot, Milton ; A. G. Muir, Grimsby ; Thomas Ballantyne, Stratford ; J. W. Scott, Lobo ; James Harris, Ingersoll ; Benj. Hopkins, Brownsville ; Geo. Halloway, West Oxford ; Richard Manning, Exeter ; James Collins, Dereham ; Stephen Hill, Paris ; John M. Raymer, Cedar Grove ; K. Graham, Belleville ; John Adams, Ingersoll ; P. Bristol, Hamburg ; J. M. Jones, Bowmanville ; H. Farrington, Norwich ; Hon. David Reesor, Markham ; secretary, James Noxon, Ingersoll ; treasurer, R. A. Janes, Ingersoll. Subsequently Messrs. Niles and Carlyle were added to the list of vice-presidents for the year.

In 1868 an Act was passed by the Legislature of Upper Canada to protect butter and cheese manufacturers, and a penalty fine of from $1 to $50 for diluting milk by water or for skimming or keeping back strippings, or otherwise tainting the milk furnished to factories.

In 1868 the first cheese fair was held in Ingersoll and was very successful ; there were also this year reports received from fifty-eight cheese factories.

In 1872 the Canadian Dairymen's Association held their 5th annual meeting at Ingersoll, and it was well attended ; but the eastern portion of the Province found it too far to travel, so established amongst themselves another organization called the Ontario Dairymen's Association, with headquarters at Belleville. This was started, I think, in 1871. It promised to do for the eastern part of the Province what its predecessors had so well done for the western. These Associations were hampered for want of means, so applied to the Government for assistance, which resulted in an amalgamation.

In 1873 the Canadian Dairyman's Association held their 6th annual meeting at Ingersoll, and the Ontario one was held at Belleville.

In 1873 it was found necessary to ask for Provincial assistance to help on the work of these two Associations, and an Act was passed by the Provincial government to allow the two Associations to amalgamate themselves into a body corporate, to be known as the " Dairymen's Association of Ontario," and if eighty members joined by paying $1 each per annum that a grant of not more than $700 be made to them.

The first meeting, according to the Act, was to be held at Belleville on February 11th, 1874, and the next two meetings at Ingersoll, as at this time there was much more cheese made in the west.

The officers elected for the year 1874 were : Ketchum Graham, Belleville, president A. Oliver, M.P.P., Ingersoll, vice-president ; J. C. Hegler, Ingersoll, secretary ; P. R. Daly, Foxboro', treasurer ; Thomas Ballantyne, M.P.P.P., Stratford ; Lewis Richardson, Kerwood ; Henry Ostrom, Mona ; Geo. Morton, Morton ; W. S. Yates, Belleville ; Allan McLean, Ingersoll ; D. Vandewater, Belleville ; Thos. Brown, Ingersoll, and T. D. Millar, Ingersoll, directors.

The principal addresses at this convention were delivered by Prof. Bell, of Belleville, X. A. Willard, of Utica, N. Y., and L. B. Arnold, Rochester, and were all on cheese subjects.

The auditors' report shows receipts from all sources of $1,317.71 and expenditures of $1,204.95, leaving a balance of $112.76. $520 were paid out this year for premiums at a cheese fair held at Ingersoll.

In 1875, the meeting of this now flourishing Association was held in Ingersoll and numbered 350 members.

The officers elected were as follows : E. Casswell, Ingersoll, president ; Peter R. Daly, Belleville, vice-president ; C. E. Chadwick, Ingersoll, treasurer ; J. C. Hegler, Ingersoll, secretary ; Ketchum Graham, Belleville ; J. W. Lawson, Salford ; D. Vandewater, Belleville ; P. Frederick, Belleville ; H. Farrington, Norwich ; Jas. Noxon, Ingersoll, and Allan McLean, Ingersoll, directors.

The auditors' report showed that $1,359 had been received and $1,183 68 paid out, leaving $175.32 on hand, and that 144 factories had reported.

In 1876 the ninth convention was again held in Ingersoll, in February, and as quoted from the report of the secretary: "It is steadily increasing in importance, and the directors felt justified in holding a three days' convention, and they were all well attended, and addresses on the manufacture of butter were also introduced."

The officers elected this year were: P. R. Daly, Belleville, president; Thos. Ballantyne, M.P.P., Stratford, vice-president; C.E. Chadwick, Ingersoll, treasurer; J C. Hegler, Ingersoll, secretary; Jas. Noxon, Ingersoll; W. S. Yates, Belleville; E. Casswell, Ingersoll; H. Farrington, Norwich; H. Ashley, Belleville; D. Vandewater, Belleville; Wm. Tripp, Mount Elgin; Geo. Hamilton, Cromarty, and P. Frederick, Belleville, Directors. There were 312 members.

Prof. Bell, of Albert College, Belleville, in his address gives 48,580,368 lbs of cheese as having been shipped in this year from Canada.

The auditors' report gives $1,703.13 as the receipts and $1,599.66 as the expenditures, leaving $103.47 in hand.

I am not able to find a report of the Dairymen's Association for 1877, but it is sufficient to say that it was found expedient to separate the Dairymen's Association of Ontario so as to form two distinct organizations, one for the east and one for the west, for the better carrying out of the work of the Association.

This brings us to the first annual meeting of the Eastern Dairymen's Association, held in Belleville on Thursday and Friday, the 21st and 22nd of February, 1878. These conventions are held for the purpose of making reports of the business done the previous year, and the delivering of lectures by experts on cheese and butter-making, to the actual cheese and butter-makers of the eastern section of this Province.

Amongst the speakers at this convention was Prof. James T. Bell of Belleville, who gave the annual export of cheese for 1877 to be 43,952,653 pounds. Prof. L. Weatherell of Boston gave a valuable paper on "Breeding and Feeding Dairy Stock," and the Hon. X. A. Willard of Herkimer, N.Y., one on "The Outlook of Dairying and its Present Needs." Other papers were read by S. Hoxie, Whitesboro, N.Y., Prof. Arnold, of Rochester, N.Y., and Prof. E. W. Stewart. The membership this year was 167, and the Government grant $1,000. The auditors' report shows an income of $1,112.50, and an expenditure of $1,138.20, leaving the Association in debt $25.70. Five hundred and four dollars and fourteen cents was expended in prizes at the cheese show, and $427.86 to pay liabilities of the old Association.

In 1879 the second annual meeting of the Eastern Dairymen's Association was held in the city of Ottawa, on the 25th, 26th and 27th days of February. The officers elected to serve this year were: Ketchum Graham, Belleville, president; W. S. Yates, Sidney, vice-president; D. Derbyshire, Farmersville, 2nd vice-president; Harford Ashley, Belleville, secretary; P. R. Daly, Foxboro', treasurer; D. M. Macpherson, Lancaster, Ira Morgan, Metcalfe, M. N. Grass, Collin's Bay, D. Vandewater, Foxboro', Platt Hinman, Grafton, and John R. Craig, Toronto, directors.

The addresses were by Prof. James T. Bell, Belleville, on "Butter-making and the Butter Trade"; Prof. Arnold, of Rochester, N.Y., on "Cheese as a Food"; Prof. L. Weatherell, of Boston, Mass., on "Specialties in Farming"; Mr. E. Barnard, of Quebec, on "The Dairy Interests of Canada"; Mr. C. E. Chadwick on "The Cow and the Grass." Questions were asked after all papers, and as an educating medium to cheese and butter-makers this convention was invaluable. One hundred and twenty-one members paid this year, and seventy-four factories reported to this Association.

In 1880 the third convention was held in the city of Kingston, on February 24th to 26th. Unfortunately, I cannot find a report for that year, but an extract from the *Globe* of February 26th, 1880, states that Ketchum Graham was president, and that addresses were delivered by Hon. X. A. Willard, of Little Falls, N.Y., on "The Commercial History of the Dairy," and another address by Harris Lewis, Frankford, on "Butter Subjects."

In 1881 the fourth convention was held in the town of Brockville, from the 24th to the 26th of February.

The following officers were elected to serve for 1881 : Ketchum Graham, Belleville, president ; D. Derbyshire, Brockville, 1st vice-president ; D. Vandewater, Foxboro', 2nd vice-president ; Div. No. 1, D. M. Macpherson, Lancaster ; No. 2, Ira Morgan, Metcalfe ; No. 3, James Bissell, Algonquin ; No 4, W. S. Yates, Sidney ; No. 5, Platt Hinman, Grafton ; No. 6, John R. Craig, Toronto, Directors ; P. R. Daly, Foxboro', treasurer, and H. Ashley, secretary.

The addresses this year were from D. M. Macpherson, Lancaster, on "The Requirements of the English Cheese Market" ; J. B. Harris, Antwerp, N.Y., a "Report on His Experience as an Instructor (first instructor) in the Eastern Section of Ontario" ; Prof. L. Weatherell, of Boston, Mass., on "Adulteration of Butter and Cheese" ; Prof. J. P. Roberts, of Ithaca, N.Y., on "The Use and Production of Milk" ; Hon. Harris Lewis, Frankfort, N.Y., on "The Testing of Milk" and "The Cow" ; Prof. L. B. Arnold, of Rochester, N.Y., on "The Manufacture and Curing of Cheese" ; Rev. W. F. Clark, Listowel, on "Honest Milk" ; A. W. Landon, Montreal, on "Oleomargarine" ; John R. Craig, Toronto, on "Meat, a Source of Food Supply" ; besides discussions by the delegates on all these subjects made this a most interesting meeting. Up to this year this Association had confined itself to educating the cheese-makers by instructive addresses at the conventions and by giving prizes to cheese at the different shows. But this year marked the commencing of a new epoch by employing Mr. J. B. Harris to visit different factories in fourteen counties. He helped to make cheese in fifty-three factories, besides visiting many others, thus filling a long wished for want, as what cheese maker has not met with difficulties that he would gladly have explained by a scientific cheese-maker? On the result of this departure lies the success of the cheese-making in the eastern section of the Province in my mind. The Government granted $1,500 this year. There were $539.48 on hand at the first of the year, and the rest of the income from members, etc., amounted to $155, making a total of $2,174.48. The disbursements were $250 to cheese prizes, $420 to J. B. Harris as instructor, the rest for convention expenses, salaries, etc., leaving $594.43 in the hands of the treasurer.

In 1882 the fifth convention was held in the city of Belleville, from February 7th to 9th. The following officers were elected for the year : Ketchum Graham, Belleville, president ; D. Derbyshire, Brockville, 1st vice-president ; D. Vandewater, Foxboro' 2nd vice president ; Div. No. 1, D. P. McKinnon, Lancaster ; No. 2, Ira Morgan, Metcalfe ; No. 3, James Bissell, Algonquin ; No. 4, Thomas Walker, Wellman's Corners ; No. 5, Platt Hinman, Grafton, No. 6, Henry Wade, Toronto, directors ; P. R. Daly, Foxboro', treasurer ; H. Ashley, Belleville, secretary.

The addresses this year were from Mr. R. Cullis, Cobourg, on "Dairy Farming" ; Prof. L. Weatherell, of Boston, Mass., on "Dairy Husbandry" ; J. B. Harris, Antwerp, N.Y., on "Dairy and Grasses" ; Mr. S. M. Barre, Quebec, on "Butter-making in Denmark" ; Prof. J. T. Bell, Belleville, on "Practical Chemistry of the Dairy and Farm" ; Prof. J. B. Roberts, Ithaca, N.Y., on "The Science of Developing and Perpetuating Milk Qualities" ; Rev. W. F. Clarke, Listowel, on "The A B C of Dairying" ; D. M. Macpherson, on "Cheese-making" ; Prof. L. B. Arnold, Rochester, N.Y., on "Modes of Acquiring Dairy Knowledge" ; B. B. Prentice, Vernon, Ont., on "Butter-making" ; Hon. Harris Lewis, Frankfort, N.Y., on "Bread and Butter," and Mr. J. B. Harris, Antwerp, N.Y., gave his second annual report as cheese instructor. He visited 107 factories in twenty four counties. The total receipts this year were $2,713.43, and the disbursements $2,258.71, leaving $454.72 in the hands of the treasurer. Four hundred and ninety-three dollars and eighty-five cents was paid to J. B. Harris instructor, and $250 to Toronto Industrial for prizes, the rest for salaries of officers and other expenses.

In 1883 the sixth convention was held in the town of Brockville, from January 31st to February 1st. The officers elected were : D. Derbyshire, Brockville, president ; D. Vandewater, Foxboro', vice president ; Thomas Walker, Wellman's Corners, 2nd vice-President ; Div. No. 1, D. M. Macpherson, Lancaster, Ont.; No. 2, Ira Morgan, Metcalfe ;

No. 3, James Bissell, Algonquin ; No. 4, James Haggarty, West Huntingdon ; No. 5, Platt Hinman, Grafton ; No. 6, Henry Wade, Toronto, directors ; P. R. Daly, Foxboro', treasurer ; H. Ashley, Belleville, secretary, and James Hamilton, Belleville, and Howard Bissell, Algonquin, auditors.

The addresses this year were from Hon. Harris Lewis, Frankfort, N.Y., on "Butter-making" ; Prof. Weatherell, Boston, Mass., on "What Farmers Must Needs Know" ; Prof. Barnard, Quebec, on "Dairying in Quebec" ; Mr. P. Gardner, Dundee, Que., on "Care in Keeping Stock" ; Mr. H. Wade, Toronto, on "Cows for the Dairy" ; J. B. Harris, Antwerp, N.Y., on "The Manufacture of Cheese for the English Market," and other subjects ; Mr. James Whitton, Wellman's Corners, Ont., on "The Sweet Curd System" ; Mr. B. McNamee, on "Butter-making" ; Mr. McAdam, on "Cheese-making" ; and the first time a representative from the Ontario Agricultural College of Guelph, in the person of Prof. William Brown, who gave a paper on "Ensilage and Breeds of Cattle for the Creamery and Dairy," and Prof. L. B. Arnold's report as cheese instructor, who had visited the principal factories during the season. The receipts this year from all sources were $2,153.72, and the disbursements $1,932.82, of which amount $569.50 was paid Prof. Arnold for inspecting, $250 to Provincial Exhibition for cheese prizes, the rest for salaries and convention.

In 1884 the seventh convention was held in the town of Peterborough from February 20th to 21st. The officers elected for this year were : D. Derbyshire, Brockville, president ; D. Vandewater, Foxboro', 1st vice-president ; Thomas Walker, Wellman's Corners, 2nd vice-president : Div. No. 1, D. M. Macpherson, Lancaster ; No. 2, Ira Morgan, Metcalfe ; No. 3, James Bissell, Algonquin ; No. 4, James Haggarty, West Huntingdon ; No. 5, Platt Hinman, Grafton ; No. 6, Henry Wade, Toronto, directors ; James Hamilton, Foxboro', and F. H. McCrea, Brockville, auditors ; P. R. Daly, Belleville, treasurer ; H. Ashley, Belleville, secretary.

The addresses this year were from Prof. William Brown, Ontario Agricultural College, Guelph, on "The Influence of Food on Dairy Products" and "The Conduct of the Ontario Experimental Farm Silos" ; Prof. L. B. Arnold, Rochester, N.Y., on "Cheese and Cheese-making" ; Prof. J. P. Roberts, Ithaca, N.Y., on "Milk, Beef, Cattle and Fertility" ; Rev. W. F. Clarke, Speedside, on "Mistakes in Dairy Farming" ; J. B. Harris, Antwerp, N.Y., on "Co-operative Cheese-making" ; Prof. Barnard, Quebec, on "Commercial Dairying in Canada."

The directors this year employed two experienced cheese-makers to do the inspecting in the six districts instead of one as heretofore, Mr. Whitton of Wellman's Corners, who reported as having visited fifty factories and advised fifteen others, and Mr. Howard Bissell, who visited eighty factories. These two instructors covered nearly all the eastern division, giving practical assistance to the cheese-makers. The Government grant was $1,500.

In 1885 the eighth annual convention was held in Morrisburg, from February 4th to 6th. The officers elected for this year were exactly the same as for 1884. The papers read and discussed were from D. M. Macpherson, on "The Secrets of Success in Dairying" ; Mr. M. Cook, Aultsville, on "Holstein Cattle" ; Prof. T. Shaw, Hamilton, on "The Possibilities of the Dairy Cow" ; Mr. H. Wade, Toronto, on "Cows for the Dairy" ; J. B. Harris, Antwerp, N.Y., on "Hints on Cheese-making" ; Prof. Arnold of Rochester, on "Dairy Products as Food" ; Prof. Weatherell of Boston, on "Dairy Husbandry" ; Mr. Thos. McDonald, Morrisburg, on "Butter-making" ; Prof. S. M. Barre, Montreal, on "How to Improve on Butter-making" ; also Mr. Howard Bissell's report on visiting 100 cheese factories, and Mr. Jas. Whitton's report on visiting and working in 106 cheese factories. Both these gentlemen stated that they worked in different factories to those they worked in last year. The Government grant was still $1,500, and the membership roll 202.

In 1886 the ninth annual convention was held in the city of Belleville from the 6th to the 9th of January. The officers elected were exactly the same as for 1884 and 1885. The speakers this year were Prof. Barre of Guelph Agricultural College, on "The

Selection of the Dairy Cow"; Mr. Cheesman of Toronto, gave a paper on "Milk Registers," written by Prof. Fream, of London, England; Prof. Roberts, of Ithaca, on "Dairy-house Talks," and "Cattle Food and Feeding"; Thos. Shaw, Hamilton, on "Possibilities of the Dairy"; W. H. Lynch, Quebec, on "The Commercial Aspect of the Dairy"; D. M. Macpherson, Lancaster, on "How to Improve the Quality and Price of Canadian Cheese"; R. J. Graham, Belleville, on "Permanent Pasture"; Prof. Harris, of Antwerp, N. Y., on "Six Years' Experience as a Cheese Instructor"; also, the reports of Mr. H. Bissell on visiting 108 factories, and Mr. J. Whitton's report on visiting 121 factories. The Government grant was still $1,500 and the sum of $700 paid to instructors, and the membership roll 117.

In 1887 the tenth annual convention was held in the town of Brockville from the 5th to the 7th of January. Quite a change was made, and the officers elected this year were: D. M. Macpherson, Lancaster, president; D. Vandewater, Chatterton, 1st vice-president; Jas. Bissell, Algonquin, 2nd vice-president; Div. No. 1, Wm. Eager, South Mountain; No. 2, Edward Kidd, North Gower; No. 3, F. H. McCrea, Brockville; No. 4, Jas. Haggarty, West Huntingdon; No. 5, Platt Hinman, Grafton; No. 6, Henry Wade, Toronto, directors; Jas. Hamilton, Foxboro', and N. H. Field, Lyn, auditors; P. R. Daly, treasurer; H. Ashley, Belleville, secretary.

The papers read this year and debated on were from Hon. Harris Lewis, Frankfort, N. Y., on "Butter-making"; Mr. Jas. Cheesman, Toronto, on "Milk Standards"; A. Blue, Bureau of Industries, Toronto, on "Dairying in the Eastern and Western Districts of this Province"; Prof. Jas. Robertson, Ontario Agricultural College, Guelph, on "Experiences of Lessons of the Indian and Colonial Exhibition," and "Cheese-making"; Mr. P. M. McFarlane, Huntingdon, Que., on "The Production and Handling of Milk"; Mr. W. H. Lynch, on "Pedigree and Performance"; Mr. H. Wade, Toronto, on "Stock Raising"; Mr. Thos. McDonald, Morrisburg, on "Butter and Cheese-making in Canada"; Thos. Shaw, Hamilton, on "Dairy Barns." Also the reports of Mr. Jas. Whitton, on visiting and giving instruction in 105 factories, and Mr. H. Bissell's report on visiting fifty-four factories. Government grant $1,500; membership roll 120.

In 1888 the eleventh convention was held in the town of Peterborough from the 4th to the 6th of January. The only change made in the officers was the electing of Mr. J. K. McCargar, Belleville, as president, in place of D. M. Macpherson, Lancaster, and J. G. Foster, Moira, and Thos. Miller, Spencerville, auditors.

At this meeting Mr. Macpherson delivered an address as president for the previous year, and a stormy debate took place on the subject of co-operation, as introduced in his address. Other papers were from Prof. Roberts, Ithaca, on "The Production of Milk and the Value of Manures"; Prof. Barnard, of Quebec, on "Profits in Dairying and Beef Raising." Ex-Governor W. D. Hoard, of Fort Atkinson, Wis., also gave several discourses on "Fertility," "Ensilage," "Heredity in the Dairy Cow," and other subjects. This was his first year amongst us, and his valuable information, eloquently given, was much appreciated. Mr. John Robertson, London, spoke on "Cheese-making"; Mr. C. C. McDonald, on "Cheese-making"; Mr. J. J. Ruddick, of Lancaster, on "Testing Milk at Factories"; Mr. Norman H. Fields, instructor, reported that he had visited sixty-five factories; Mr. Jas. Whitton reported that he had visited 110 factories, and Mr. H. Bissell that he had worked twenty-five days and then resigned to accept another position, Mr. Field taking his place. No change in Government grant, and about the same spent for instruction, and 104 members paid.

In 1889 the twelfth annual convention was held at Smith's Falls from January 8th to 10th. President J. K. McCargar, of Belleville, in the chair. The officers elected for the coming year were: M. K. Everts, Easton's Corners, president; Jas. Haggarty, West Huntingdon, 1st vice-president; F. McCrae, Brockville, 2nd vice-president; District No. 1, Wm. Eager, South Mountain; No. 2, E. Kidd, North Gower; No. 3, Jas. Bissell, Algonquin; No. 4, D. Vandewater, Chatterton; No. 5, Platt Hinman, Grafton; No. 6, H. Wade, Toronto, directors; J. G. Foster, Moira, and T. J. Miller, Spencerville, auditors; P. R. Daly, Foxboro', treasurer; H. Ashley, Belleville, secretary.

The addresses delivered this year were by Prof. Jas. Robertson, on "Co-operative Dairying as it Was, Is, and as it Should Be," "The Hog as an Adjunct to the Dairy," and "Cheese-making for Beginners"; Prof. Roberts, Ithaca, N. Y., on "Why do we Feed Dairy Cows," "The Soil, the Plant and the Animal"; Prof. J. B. Harris, Antwerp, N.Y., on "How not to do it—a new version"; D. M. Macpherson, Lancaster, on "Lessons of this Convention"; report of Robert Rollins, inspector, visited seventy factoriee, several of them twice; report of Jas. Whitton, who visited fifty factories.

In 1890 the thirteenth convention was held in the city of Belleville from January 8th to 11th, with the president, M. K. Evertts, Easton's Corners, in the chair. The officers elected this year were: J. D. Warrington, Belleville, president; F. H. McCrea, Brockville, 1st vice president; Platt Hinman, Grafton, 2nd vice-president; and the only change in the directorate was the electing in District No. 5 of Mr. J. B. Carlaw in place of Mr. P. Hinman, promoted.

The addresses this year were from Prof. Jas. Robertson, of Guelph, on "Cheesemakers and Inspectors," "Fodder Corn and the Silo"; Mr. J. Massey, on "Winter Dairying"; Senator Read, on "The Present Requirements of Dairying"; Governor Hoard, of Wisconsin, on "The Cow." The cheese instructors, J. A. Ruddick, Hugh Howey, G. G. Publow, and A. E. Bailey, all gave interesting reports of their work for the year. The importance of the inspecting of factories was duly recognized this year when four men were employed.

In 1891 the fourteenth convention was held in the town of Brockville from January 8th to 9th; the president, John T. Warrington, jr., in the chair. The following officers were elected: Wm. Eager, Morrisburg, president; Platt Hinman, Grafton, 1st vice-president; H. Bissell, Algonquin, 2nd vice-president, Div. No. 1, E. Kidd, North Gower; No. 2, John McTavish, Vancamp; No. 3, Richard Murphy, Elgin; No. 4, D. Vandewater, Chatterton; No. 5, T. B. Carlaw, Warkworth; No. 6, H. Wade, Toronto, directors; J. G. Foster, Moira, and M. K. Evertts, Easton's Corners, auditors. No change in the treasurer and secretary.

Addresses this year were from D. Derbyshire, mayor of Brockville, "Welcome"; H. Bissell, Algonquin, on "Makers, Making and Competition," also R. G. Murphy, of Elgin, on same subject; M. K. Evertts, Easton's Corners, on "Present State of Dairying in the Province"; D. M. Macpherson, Lancaster, on "Benefits of Association Work"; Prof. Jas. Robertson, Ottawa, on "Winter Dairying," and "Mind and Muscle on the Farm"; Sidney Fisher, M.P., Brome, Que., spoke on "Butter-making and Mental Culture." An address was read by both the mayor of Brockville and the president to the Hon. John Dryden, Minister of Agriculture for Ontario, who made a happy response. Governor Hoard, of Wisconsin, on "The Winter Care of Cows and Breeding," "Temperament in the Dairy Cow"; Mr. A. A. Ayer, Montreal, on "Preparing Cheese for the Market and Boxing Cheese"; Thomas Ballantyne, M.P.P., Stratford, on "Cheese Subjects." Then came the four inspectors' reports, J. A. Ruddick, G. G. Publow, A. E. Bailey and Robt. Rollins. These subjects were all discussed by the audience. The Government grant this year was $2,500, and the inspectors were paid $2,343 of this amount. A banquet was given the visiting members by the town of Brockville in the St. Lawrence Hall.

In 1892 the fifteenth convention was held in the town of Cobourg on the 7th and 8th of January, the president, Wm. Eager, of Morrisburg, in the chair. The only change of officers this year was in making Wm. Duff, Inverary, 2nd vice-president, and in electing for District No. 4, Jas. Whitton, of Belleville, a director. The addresses this year were from the president, Wm. Eager; D. Derbyshire, Brockville, on "An Improvement in the Manufacture of Cheese"; D. M. Macpherson, Lancaster, "The Cow and the Product," and "Practical Hints on Cheese-making"; C. C. James, Deputy Minister of Agriculture, Toronto, on "The Past and Present of Dairying;" Prof. H. H. Dean, Guelph, on "How to Make Dairying a Success"; Prof. James Robertson, Ottawa, on "Observations on the Progress of Dairying in Canada"; ex-Gov. Hoard of Wisconsin, on "Paying for Creamery Milk according to Quality"; Prof. F. T. Shutt, Ottawa, on

"Estimating Butter-Fat by the Babcock Method," and "Fodder Cheese"; Prof. J. P. Roberts, Ithaca, N. Y., on "Effects of Food on the Dairy Cow and Hints regarding the Soil and Manuring"; J. A. Ruddick, of Ottawa, gave a practical talk on "Winter Butter-making." Then came the reports of Wm. McLeod, inspector, who visited 62 factories; R. Rollins, who visited 62 factories; G. G. Publow, who visited 60 factories, and A. Bailey, who visited 200 factories. This year the Provincial Government gave $2,000 and the factories contributed $1,386 towards the $2,856.95 paid out to instructors.

In 1893 the sixteenth convention was held in the city of Kingston on the 18th and 19th of January, Wm. Eager, Morrisburg, president, in the chair. Mr. Wm. Bissell, of Algonquin, was elected president; Wm. Duff, Inverary, 1st vice-president, and John McTavish, Vancamp, 2nd vice-president; Division No. 1, E. Kidd, North Gower; No. 2, Wm. Eager, Morrisburg; No. 3, R. G. Murphy, Elgin; No. 4, Jas. Whitton, Wellman's Corners; No. 5, T. B. Carlaw, Warkworth; No. 6, H. Wade, Toronto, directors; M. Bird of Belleville, and W. H. Thomson of Prescott, auditors. No change in the treasurer or secretary.

The addresses were given from Wm. Eager, president; D. Derbyshire, Brockville, on "Some Present Considerations"; Prof. H. H. Dean, Guelph, on "The Influence of Food on Milk and Butter"; Prof. J. A. Ruddick, Ottawa, on "Experiments in Cheese-making at the Perth Dairy"; "Mistakes in Cheese-making"; C. C. James, Deputy Minister of Agriculture, Toronto, on "The Tale of a Cheese," and "Man the Chief Factor"; Prof. Saunders, Ottawa, on "Prof. Robertson's Mission to England"; Prof. F. T. Shutt, Ottawa, on "Home Grown Coarse Fodders"; Geo. Taylor, M.P., Gananoque, on "Adulteration of Dairy Products"; Mrs. E. M. Jones, Brockville, on "Butter-making," read by D. Derbyshire Then the reports of five inspectors: Mr. McEwan, a special instructor, visited 184 factories in all parts of the Eastern Division; Wm. McLeod, who visited 26 factories; G. G. Publow, who visited 70 factories; R. Rollins, who visited 63 factories; and A. Bailey, who visited 342 factories. Grant from Government, $2,750, fees from factories, $1,460, payment to inspectors, $2,826.55.

In 1894 the seventeenth convention was held in the town of Peterborough on the 3rd and 4th of January, Wm. Bissell, Algonquin, in the chair. The officers elected this year were T. B. Carlaw, Warkworth, president; John McTavish, Vancamp, 1st vice-president; E. A. Madden, Newburg, 2nd vice-president. The only change in directors was in Division No. 5, where M. E. Sanderson, Selwyn, was elected, and J. R. Dargavel, Elgin, was elected auditor in place of W. H. Thomson, Prescott. No change in treasurer r secretary.

The addresses were from the president, Wm. Bissell, on opening the meeting; D. Derbyshire, on "A Year of Victory and Progress"; J. T. Warrington, Belleville, on "Talk to Local Dairymen"; A. W. Grant, Montreal, on "Canadian Cheese Trade"; James Whitton, on "Making and Buying"; Prof. H. H. Dean, Ontario Agricultural College, Guelph, on "Winter Dairying to the Front," "Science in the Dairy"; Andrew Pattullo, Woodstock, on "The Advance of Dairy Interests"; J. Wheaton, secretary Western Dairymen's Association, on "Cheese Subjects"; Prof. J. A. Ruddick, Central Experimental Farm, Ottawa, on "Winter Dairying in Ontario"; C. C. James, Deputy Minister of Agriculture, Toronto, on "Our Home Market," "The Weather, its Influence on Dairying"; Prof. Jas. Robertson, Dairy Commissioner, Ottawa, on "Our Cheese Exhibit at the World's Fair," and "Cheese-making, Winter Dairying"; Prof. F. T. Shutt, Ottawa, on "Fodder Corn: It's Value, Growth and Preservation"; W. W. Grant, Lakefield, on "Cheese making as an Occupation." The cheese instructors' reports were from G. G. Publow, who visited 60 factories; R. Rollins, who visited 65 factories; G. H. Bensley, who visited 74 factories; A. P. Purvis, who visited 57 factories; also J. B. McEwan, who visited 184 factories as dairy school instructor.

In 1895 the 18th convention took place in the town of Gananoque, the president, T. B. Carlaw in the chair. The officers elected were, Ed. Kidd, North Gower, president; E. J. Madden, Newburg, 1st vice-president; John McTavish, Vancamp, 2nd vice-president; No. 1, R. A. Craig, North Gower; No. 2, Wm. Eager, Morrisburg; No. 3, John R.

Dargavel, Elgin; No. 4, Jas. Whitton, Wellman's Corners; No. 5, T. B. Carlaw, Warkworth; No. 6, H. Wade, Toronto, directors; M. Bird, Stirling, and Wm. Bissell, Algonquin, auditors; P. R. Daly, treasurer; R. G. Murphy, Elgin, secretary, in place of H. Ashley, who had acted for eighteen years, resigned.

The addresses were from the president, T. B. Carlaw; O. D. Cowan, Mayor of Gananoque, "A Welcome"; Geo. Taylor, M.P., on "A Fight for Pure Butter and Cheese in Canada"; D. Derbyshire, on "Things New and Old Regarding the Cheese Trade"; Prof. H. Dean, Guelph, on "Co-operation in Dairy Experimental Work," "Paying at Cheese Factories by the Babcock Test"; Geo. Y. Chown, Kingston, on "The Kingston Dairy School" also J. A. Ruddick, on the same subject; F. T. Shutt, Ottawa, on "The Experimental Farm System" and "Composition of Dairy Products"; John Gould, Aurora, Ohio, U. S., on "Care of the Dairy Cow and Corn Ensilage"; Hon. John Dryden, Minister of Agriculture, also in answer to addresses from Board of Trade on "Agricultural Progress in Canada"; N. Awrey, M.P.P., in answer to addresses from Reeve of Lansdowne, J. A. Webster, also on "Cheese-making"; D. M. Macpherson, M.P.P., on "Winter Dairying"; A. Patullo, president Western Dairymen's Association, on "Good Roads for Dairymen"; Prof. Robertson, on "How to Feed a Cow"; W. W. Grant, Lakefield, on "Instructing in Cheese-making."

In 1896 the 19th convention was held in the village of Campbellford, on the 8th, 9th and 10th of January, and was a great success, the audience being principally cheese and butter-makers. The chair was occupied by Ed. Kidd, president. The officers elected for 1896 were, Henry Wade, Toronto, president; John McTavish, Vancamp, 1st vice-president; E. J. Madden, Newburg, 2nd vice-president. The only change in the directorate was electing Ed. Kidd of North Gower for division No. 1; P. R. Daly, Foxboro', treasurer; R. G. Murphy, Elgin, secretary; M. Bird, Stirling, and F. Brenton, Belleville, auditors.

The addresses were from Ed. Kidd, president, "Annual Address"; D. Derbyshire, Brockville, on "Dairying, the Leading Farm Industry, and Dairy Education"; Wm. Eager, Morrisburg, on "Practical Experience with the Babcock Test"; Prof. James Fletcher, Ottawa, on "Agricultural Grasses and their Cultivation," "The Care of House Plants" and "The Horn Fly"; Mr. John Gould, Aurora Station, Ohio, U. S., on "Cheapening the Cost of the Production of Milk," "Growing Corn for the Silo," and "The Stable Life of a Dairy Cow"; Hon. John Dryden, Minister of Agriculture, on "Dairy Matters" and "A United People"; Prof. Jas. Robertson, Dairy Commissioner, Ottawa, on "Hog Raising," "Bread and Milk and Bread and Butter"; Prof. H. H. Dean, Guelph, on "Effect of Temperature, Rennet, Acid and Salt," "Adding two per cent. to Fat Readings in Cheese Factories." Prof. J. A. Ruddick, superintendent of Dairy School, Kingston, gave a description of the work at the Dairy School.

It will be seen by a perusal of this historical sketch, that the first Dairymen's Association was organized in 1867, just 30 years ago; it struggled along for seven years without provincial assistance, after that with $700 per year, until in 1887 it was found impossible for one Association to do justice to all of Ontario, so the Province was divided into two sections, and the Eastern and Western Dairymen's Associations were formed with a separate grant and separate officers. Up to 1881, the work of the Eastern Dairymen's Association was confined to the educating medium of the convention, in discussing cheese and butter subjects, and in giving prizes at special cheese shows, or in giving grants to the Provincial and Industrial Exhibitions for that purpose. That year, and in 1882, Prof. J. B. Harris was engaged to visit and lecture at factories; and in 1883, Prof. Arnold, of Rochester, was engaged for the same purpose. In 1884, two experienced cheese-makers, Mr. J. Whitton and Mr. H. Bissell were engaged; after a few years more inspectors were employed, and in 1895 we had no less than five instructors employed during the summer months.

# DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

## TWENTIETH ANNUAL CONVENTION.

The Twentieth Annual Convention of the Association was held at Brantford on January 19th, 20th and 21st, 1897. The first session opened at 1.30 p.m. on the 19th. Mr. A. F. McLaren, M.P., Stratford, Ontario, President of the Association, in the chair.

The President, after calling the large audience to order, and wishing them a happy, prosperous and successful year, called upon the Secretary to read the Directors' report.

## DIRECTORS' REPORT.

*To the Members of the Dairymen's Association of Western Ontario:*

Gentlemen,—Your Directors for 1896 beg to report as follows: We have endeavored during the year to carry on the varied work of the Association in our charge with vigor and efficiency, and believe that our efforts have not been without beneficial results. There yet remains considerable to be done towards improving and bringing about a greater uniformity in the quality of our dairy products.

Your Board of Directors held six meetings during the year. Two of these were held during the annual convention at Woodstock. Your Executive Committee met four times. This increased number of meetings was due largely to the extra work devolving upon the Board in organizing the Cheese Factory Syndicate.

The usual circular was sent out to factorymen, at the beginning of the season, outlining the policy and work of the Board for the year. Later in the season, a form of agreement for use between makers and factorymen was sent out, which will tend to more systematic and definite work. In addition to his regular office duties, the Secretary continued his regular work of addressing meetings of dairymen, and assisted more in the visitation of factories.

The very successful annual gathering held at Woodstock last January was supplemented during February by four local conventions held at Dunnville, Forest, Listowel and Elmira. These were largely attended by the dairymen and farmers in these sections and served to a great extent to reach those who were unable to get to the annual convention. In addition to the talent furnished by your Board and the officers of the Association, valuable assistance was rendered by Professors Robertson and Dean. The presence of these well-known dairy authorities indicate the importance and scope of these local gatherings.

We have also continued the system of special instruction through Inspector Millar during the early part of the season, as during the previous year, with very good results. About the first of June the regular work of visiting factories on application began. The number of applications made for the Inspector's services was not as large as during

previous years. In addition your Board had Mr. Millar visit as many factories as possible after the making season was over and give instruction to the makers in curing cheese. The information gleaned from this work was of great benefit to the Board, and showed that a large number of factorymen and makers have considerable to learn in regard to curing cheese properly for export.

With a view to carrying out your wishes, expressed at the Woodstock convention last year, for more thorough inspection and instruction in the factories, your Board organized a syndicate of factories for that purpose. This movement met with considerable opposition from the factorymen, because of the extra expense connected with it. But, finally, after repeated attempts to organize syndicates in the Oxford and Listowel districts, a group of seventeen factories, situated partly in the Ingersoll and London districts was secured, which agreed to pay a nominal fee in order to give the scheme a trial, the Association paying the larger share of the cost. Mr. J. B. Muir, a maker of long experience, was placed in charge of the group. Though hampered somewhat by an unfortunate accident to the Instructor in the middle of the season, the results obtained from this scheme amply justify the expenditure incurred. We call your special attention to the more detailed reports of this work given by your Secretary and the instructor in charge, and trust that they will be fully and thoroughly discussed.

We beg to report that the usual grants of $100 to the Western Fair, $50 to the Industrial Fair, and $50 to the Provincial Fat Stock and Dairy Show, were made during the year. The reports of the dairy exhibits at these fairs, which will be given by your secretary, show that the moneys expended for this purpose have been wisely and justly administered.

The following letter, proposing the amalgamation of the Ontario Creameries' Association with the two Dairymen's Associations of the Province, was received by the individual members of your Board from the Hon. John Dryden, Minister of Agriculture, Toronto, and which is of such vital importance to this Association that we give it in full :

TORONTO, Nov. 16, 1896.

DEAR SIR,—Nearly five years ago, in an address delivered by me at the Eighth Annual Convention of Creameries' Association, held in the town of Harriston, I used the following language, as reported in the record of that meeting :

"There cannot be any warfare between the manufacturers of cheese and butter ; in fact they are getting closer together every year, and every month of the year, and by-and-by we shall have them overlapping each other's work—the cheese men making butter, and the butter-makers making cheese. When this is being accomplished all over the country, there should be a joining together of the two. When the iron is hot I should like to weld them together. Then we shall have one grand dairymen's association."

I have never abandoned this expectation, nor doubted its desirability, and it appears to me that the present time is opportune for its accomplishment.

An increasing number of cheese factories are being utilized in winter for the manufacture of butter I estimate that one hundred creameries have been in operation in 1896 during the summer months. These will, no doubt, continue to operate throughout the winter. From the best information I can gather, I estimate that fully forty cheese factories will also engage in the manufacture of butter during the winter months. It is, therefore, plain that the same individuals and the same sections of country are equally interested in these two dairy products. Under this state of things, all that relates both to butter and cheese must necessarily be considered by each association ; and, therefore, each must in the future supplement the other to some extent, and cover practically the same ground.

The discussion of subjects relating to the choice of cattle, the care, management and food necessary to secure the best results, must always be the same in both cases. Each of these associations sends out instructors, with the view of bringing the quality of the products towards greater excellence and uniformity. As the work of cheese and butter associations cover the same territory, instructors from each association must necessarily go over the same ground, where one instructor, competent in both cheese and butter making, could do the work equally well, and thus effect a saving in time and travelling expenses.

Taking in the situation as it appears at present, it seems to me eminently proper that there should be a concentration of forces, with a view of greater strength and efficiency.

The first object gained would be to lessen the cost of management and thus give an increased amount towards additional instruction and inspection, so necessary to greater uniformity of products. From a careful estimate I have made, I am of opinion that out of the present grant fully two thousand dollars might be diverted from expenses of management towards this necessary work.

The second important object gained would be the substitution of one representative body from the three at present in existence, with which would rest the oversight and direction of all matters of common interest.

At the present stage of our dairy industry, it seems highly important that the Departments of Agriculture for the Province and Dominion should have one representative authority which might be easily reached for consultation and co-operation in carrying forward such measures as will shortly be necessary in the extension of our markets for these products. By establishing proper cold storage facilities in transportation, we shall be provided with the aid necessary to reach these markets; but in working out the details of the scheme, there must inevitably be many things demanding consideration and consultation as between the producers and those acting for the Government in the matter. It will be almost impossible for the representatives of the Government to deal with three bodies, having, it may be, different opinions, and working in some senses towards cross purposes.

In the hope that my suggestion may meet with approval, I venture to suggest that the three dairy associations be amalgamated into one, and this amalgamated association be divided into two parts, having an eastern and western board.

Or, if it is thought best, the Eastern and Western Dairymen's Associations might continue to exist; but in that case, in order to carry out my thought as previously expressed, each of these bodies should appoint an executive committee consisting, say, of four members, two of whom might be specially interested in butter and two in cheese. These two committees would form a Central Board, whose business it should be to carry forward such work as might be of common interest to both the Eastern and Western divisions of the Association.

The representatives of the Dominion Government, in making any arrangements for carrying out the cold storage plans, would necessarily consult with this body.

This would lead also to another departure, that of employing the same secretary for both branches of the Association or for the different bodies, as the case might be, such secretary being required to give his whole time to the development of this industry; the whole scheme tending towards greater consolidation, greater unity and greater uniformity, both in the work and in the results that would accrue.

Should your Association desire to co-operate in the matter of carrying out the scheme as outlined above, it might be deemed advisable to appoint a special committee to confer with a similar committee from each of the other Associations.

I am writing thus early, because it may be necessary to make some alterations in the statutory provisions regarding the Associations.

Yours very truly,

JOHN DRYDEN,
Minister of Agriculture.

The proposal contained in this communication was carefully considered by your Board, and the following resolution unanimously adopted:

"Moved by Mr. Andrew Pattullo, M.P.P., Woodstock, and seconded by Mr. John S. Pearce, London, that this Board, having fully considered the Minister of Agriculture's letter referring to the amalgamation of the Ontario Creameries' Association with the Dairymen's Associations of Eastern and Western Ontario, and the forming of a central dairy board for the Province, desire to express their unanimous approval of the general features of the scheme, and do hereby instruct the Executive Committee to confer with Mr. Dryden and committees from the other Associations in perfecting the details of the scheme."

In adopting this resolution your Board felt that they were voicing your wishes, and trust that this proposal for more united and systematic action in connection with the Dairy Association work of the Province will receive your careful consideration and endorsation.

On December 30th last, the representatives from the three dairy associations of the Province met in conference with the Minister of Agriculture in Mr. Henry Wade's office, Parliament Buildings, Toronto, and after a full and free discussion of the proposed amalgamation scheme, the following resolution was unanimously adopted:

"Moved by Mr. D. Derbyshire, President of the Ontario Creameries' Association, and seconded by Mr. A. F. MacLaren, M.P., President of the Western Ontario Dairymen's Association, and resolved, that the three Associations as now existing, be amalgamated into two new associations, to be called the Butter and Cheese Association of Eastern and Western Ontario, respectively, with an executive committee of three from each to form a central advisory board."

As this resolution states, the incoming year will witness a reunion of the cheese and butter interests of the Province. We believe the concentration of forces to be in the best interests of our important dairy industry, and that by diverting a large share of the grants, which formerly went for the cost of management of these associations, towards more instruction in our cheese factories and creameries much better results will be obtained.

Every careful observer will note that the sanitary condition of many of our cheese factories and creameries is not what it should be. With a view to bringing about an improvement in this particular your Board appointed a committee to confer with the Minister of Agriculture in regard to it. This matter was brought before the Minister and the representatives from the other Associations at the joint meeting on December 30th.

During the latter part of the season there were several applications from factorymen and makers for the Association's inspectors and officers to arbitrate between cheese buyers and factories in cases where cheese have been rejected. Your Board are of the opinion that it would not be in the best interests of this Association to undertake such work, and would refer such cases to the Dairy Board of Trade where the cheese were sold.

The statement of the financial affairs of the Association will be laid before you by our Treasurer, from which, we believe, you will find that the business of the year has been carried on efficiently and with as great a regard for economy as the varied work and interests of the Association would permit.

We are pleased to be able to say that the past season's trade showed considerable improvement over that of the previous year. Prices were low at the beginning of the season, but increased as the season advanced, with the result that the fall makes of cheese were disposed of at very considerable profit to factorymen and patrons. There have, however, been several serious difficulties connected with this season's operations, such as the turnip and apple flavors in cheese, the improper curing of cheese, etc., which we hope will receive your best attention, and be fully discussed during this convention.

Winter dairying has largely increased during the past year, and many of our larger cheese factories are now making butter during the winter months. Owing to the increased interest in this branch, one session of this convention will be devoted to practical addresses and discussions on winter butter-making.

It is our painful duty, before closing this report, to chronicle the fact that since we last met together two old and valued friends of this Association have passed to the great beyond: Mr. C. E. Chadwick, for many years your active secretary, and lately your esteemed Honorary Secretary, passed away, after a lingering illness, last February; and Mr. Edwin Casswell, who on several occasions held the highest office in your gift, and for many years was a member of your Board of Directors, died very suddenly at his place of business last October. The mere mention of these names will be sufficient to recall to your minds the important work done by them and the sacrifices they made in connection with the early history of this Association and the development of the important cheese industry of this Province. It is the hope of your directors that this convention will place on record its appreciation of the great services rendered to this Association and the dairy industry of Canada by our deceased friends in appropriate resolutions and testimonials.

The more salient features of the work of the Board for the past year have only been touched upon briefly in this report. You will receive fuller information as to the work of the Board and its officers in the reports of the Secretary and the Association's inspectors.

In conclusion, we beg to say that we have endeavored to provide as excellent a programme for this convention as possible, and trust that it will be as successful as any in the past, and that the season of 1897 will prove more satisfactory to all interested in the dairy industry of this portion of our fair Province.

Wishing you a prosperous and happy New Year, we remain, on behalf of your Board of Directors for 1896,

A. F. MacLaren, President.
J. W. Wheaton, Secretary.

## PRESIDENT'S ADDRESS.

By A. F. McLaren, M.P., Stratford.

If arrangements are carried out for the purpose of amalgamating our Creameries' Association with our Dairymen's Association, then this will be the last convention at which any president will have the privilege of addressing you as members of the Dairymen's Association of Western Ontario, as it is understood that the three Associations have, by mutual consent, decided to amalgamate, and form two new Associations which will be known as the Butter and Cheese Associations of Eastern and Western Ontario. This I consider another step in the right direction, as butter making is now very closely connected with cheese making, and a uniting of forces will disseminate as much information as heretofore and at much less cost.

It is not my intention to address this convention at any great length, as the gentlemen associated with me all know I am a man of few words and short speeches, but I shall as briefly as possible give you a slight idea of the work accomplished by our Association during the past year. The purpose of this Association has always been to advance and promote the great cheese industry of Canada, and I think you will all agree with me when I state that this Association has done a great deal towards the placing of our cheese in such a prominent position in the markets of the world, and that there is still great room for improvement and advancement, and that we require a large amount of work to be done before we have reached the point of perfection, which I would like to see attained.

An extra effort was made by your Directors towards inspecting milk and giving instruction in making and curing cheese. Good work was done by Inspector Millar in visiting a great many factories in the fall, and instructing the makers and advising with them how they should cure their cheese, a report of which he will give you.

The syndicate system inaugurated last spring has proved to be a step in the right direction, and I believe furnished us with a means of improving and bringing about a greater uniformity in our cheese. The necessity of some definite system of instruction is recognized by everyone connected with the industry, and I hope that in another year the number of syndicates will be largely increased, and as our Secretary, Mr. Wheaton, has received some very satisfactory reports from those in charge of the syndicate factories regarding this work, I have no doubt we will have little difficulty in increasing the number, and instead of the Association looking up syndicates, the syndicates will be looking for the Association to take charge of them. As the Directors' and officers' reports will give full particulars of the work of the year, I will not take up your time any further on this subject, but will make a few suggestions as to what I think would be in the best interests of the Association and the industry which it fosters.

It is gratifying to know that prices have been better this year. At the same time it is to be regretted that the quality of a large portion of the cheese made in Ontario has not improved as it should, considering the instruction and advice given to patrons and cheese-makers and all interested during the past few years. It is my opinion that with the means of acquiring knowledge of the latest and best methods of carrying on the dairy business,—those interested in dairying being provided with dairy schools, dairy commissioners,—travelling instructors, etc.,—we should have made more advancement than we have made. In my own experience, with the past season's trade, I have seen many wrong things, and I do not hesitate to say that never before was there a greater need that patrons should give more attention to the care of the milk for cheesemaking, and that makers should better understand that they should not attempt to make good flavored cheese from poor flavored milk; and when they have a lot of good and well made cheese, they should give their best attention to the curing, something I am again sorry to say that has been very, very sadly neglected during the last fall and winter by many cheese-makers and factorymen, being sometimes the fault of the one and sometimes of the other. The greatest faults to be found with the past season's make are the bad flavours, due to careless patrons and the feeding of turnips, rye, apples, etc., etc., to the cows.

I also found that by using a starter a great number of cheese were almost ruined. I may here state that I never was in favour of a starter being used. While it may be used to advantage late in the fall, I think it much better to heat the milk so that it will develop acid more rapidly, and even if this process does take longer, it is much safer. To me, using a starter to hasten the development of acid, is like using coal oil to start a fire—*dangerous*, and I hope the cheese-makers will thoroughly thrash out this starter business, which has been the cause of a lot of bad cheese being in some factories during the past season, as I have actually found some cheese-makers using it in June, July and August.

We have also found a great many very poorly cured cheese, bad curing rooms not properly equipped, and seeming carelessness or ignorance on the part of some cheese-makers as to the temperature required, and the conditions to be maintained in properly curing cheese for export.

I do not wish to worry you, nor take up too much time by going into detail, but I do want to draw your attention to some important features of the past season's work, in which I think a great many improvements may be made, and which I hope will be fully discussed here. I cannot for my life understand why patrons who are supplying milk to cheese and butter factories will persist in feeding improper food to milch cows, knowing at the time they are doing so that the flavour of the butter or cheese will be impaired, and that with such food as turnips, rye, rape, apples, etc., the cheese will depreciate in value all the way from one-half cent to two and a half cents per pound according to the extent of injury to flavor. If they must grow food such as turnips, rye, apples or anything which will injure the flavor in milk, butter or cheese, why not feed it to the other stock on the farm and not to the milch cows. I think I am within the limit when I state that I know at least forty factories where cheese have been rejected and resold at a reduced price of all the way from one-half cent to two and a half cents per pound because the patrons of those factories would persist in sending to the factory milk from cows which had been fed some of the above-named foods. All patrons of cheese factories are manufacturers, inasmuch as our factories are co operative, and it should be to their interest to stop such practices which injure our good reputation for fine cheese and reduce or lessen their profits.

Another great difficulty, and one for which there is no excuse, that we have had to contend with, is the careless and improper manner in which cheese have been cured. This was of very frequent occurrence in the early and late made cheese. Many curing rooms are totally unfit for curing cheese during the cold and hot weather. A great many factories have good curing rooms but have not proper heating arrangements. It is high time that the Directors were doing away with the small box-stove in the corner, and replacing it with a good coal stove with a tin jacket around it, or a good furnace; then there would be no excuse for buyers coming round and rejecting cheese simply because they were improperly cured. Then again, many buildings are totally unfit for either making or curing cheese. How can you expect well cured cheese in a curing-room raised two or three feet from the ground, with wind blowing through floor, windows and cracks in the walls? Unless many of our factories improve their buildings and furnish better facilities for manufacturing cheese, it will be necessary for them to drop out of the business, especially during the early and later portions of the cheese making season. In fact, I would like to see the day when cheese factories would not open until May 1st, and close October 31st. We would then have better quality, better prices, and a better reputation.

Just one word with regard to curing rooms in hot weather: I have frequently examined cheese at two or three weeks old which were all right in flavor and texture, and have examined the same cheese a week or two later after a severe hot spell, and found them all off flavor, open in texture, greasy, and in every way an inferior lot. This injury to the cheese could have been prevented by some system of cold storage at the factory. I would suggest that an ice-house be built in connection with all cheese factories, and that by some system the ice or cold air could be conveyed to the curing room during the hot spells. In this way we could prevent the cheese from becoming overheated, and anyway I think the factory is the place where the cold storage should begin, as what is the use of shipping injured, overheated goods in refrigerator cars and steamboats? First of all, manufacture

good goods, then protect them from injury by heat in the factory, on the railway, on the sea, and when they arrive in England. The same applies to our butter factories, and as we are converting so many of our cheese factories into butter factories for winter butter making, I would urge upon all the necessity of fitting up factories in latest improved style, so as to make a quality of butter which will be suitable for export. We will have to compete with Denmark, New Zealand and other countries, and if we wish to occupy a position similar to that which we now hold in connection with our cheese we must leave no stone unturned in manufacturing a first class article, and I trust that the patrons will aid their butter-makers by supplying a good quality of milk.

The branding bill of which you have all heard so much will come up before this convention for discussion. The Hon. Mr. Fisher, Minister of Agriculture, will be here to receive your views, and I trust you will express your opinion freely, as Mr. Fisher is anxious and willing to do in this matter what he finds is to the best interest of the great cheese industry of Canada as far as possible, and will no doubt do all in his power to pass a bill which will meet with the approval of both manufacturers and dealers.

Another suggestion I want to make before closing will, I think, meet with the approval of both buyers and sellers. You all know that many times during the past year a great many disputes arose between buyer and seller, and I think it would be a good idea to advise that a board of arbitrators be appointed in connection with each cheese board for the purpose of settling disputes. Many times the fault is placed on the wrong man, and if a board of good men as arbitrators were appointed the blame would be placed where it belonged, and the reputations of innocent men would not be injured, as cheese-makers, cheese salesmen and cheese buyers are all often blamed when they should not be.

It is gratifying to have with us at this convention both the Dominion and Provincial Ministers of Agriculture. The Hon. Mr. Fisher, who will address you, merits the thanks of the dairymen and farmers of this country for the interest he is taking in agricultural matters, and the efforts he is putting forth for the carrying out of cold storage facilities in the transportation of dairy products.

This Association has always had a very warm friend in the Hon. John Dryden, the Provincial Minister of Agriculture, whom we are pleased to have with us. I know whereof I speak when I say that Mr. Dryden has always recognized the importance of the cheese and butter interest of this Province, and has been generous in his grants to our Association. I trust that we shall continue to merit his good will, and that in making future grants he may feel that our Association is giving good returns for the money expended; and I trust that the good Lord may put it in the mind of our generous Minister of Agriculture to still further increase our grant so that we may still further spread the gospel of milk, butter and cheese.

I am also delighted to tell you we have with us such a prominent dairyman as the Hon. W. D. Hoard, ex-Governor of Wisconsin, U.S., a gentleman of whom you have all heard and of whom too many good things cannot be said. I am also pleased to state that we have J. H. Monrad, of Winnetka, Ill., who is Secretary of Illinois Dairymen's Association, and an expert in everything connected with milk, cheese and butter. I shall now close by wishing you all a happy, prosperous and successful New Year.

## INSPECTOR MILLAR'S REPORT.

In presenting to you my sixth annual report I wish to ask your indulgence, as I have been requested to report on several new features which call for a longer report than usual.

The work of special instruction in cheese making was taken up in the months of April and May. After the 1st of June I visited the factories according to application, devoting most of the time to giving instruction to cheese-makers. I spent very little time at milk testing until the 1st of September, devoting most of September and October to this work. During the balance of the season I visited factories in the different dis-

tricts, the object in view being to try if possible to get the factorymen to cure the fall cheese better, and when I read that part of my report you will see the need and wisdom of taking up this part of the work. In all I visited one hundred and nine cheese factories and eight butter factories, making one hundred and fifty-six visits, this being the greatest number of visits that I have ever made in one season.

The factories selected for the special work in April and May were as follows :-

| | | | | | |
|---|---|---|---|---|---|
| Dorchester | April | 17th | and 18th. | May 8th | and 9th. |
| Mapleton | " | 20th | " 21st. | " 11th | " 12th. |
| Strathalan | " | 22nd | " 23rd. | " 13th | " 14th. |
| Elma | " | 24th | " 25th. | " 15th | " 16th. |
| Black Creek | " | 27th | " 28th. | " 18th | " 19th. |
| North Brant | " | 29th | " 30th. | " 20th | " 21st. |
| Brownsville | May | 1st | " 2nd, | " 22nd | " 23rd. |
| Attercliffe Station | " | 4th | " 5th. | " | 26th. |
| Walsh | " | 6th | " 7th. | " | 29th. |

It will be noticed that I did not visit as many factories in connection with this part of the work as formerly, but practically covered the same territory. During the first week in May I contracted a severe cold and had to quit work for a few days. On account of this I did not visit Walsh, Maple Grove or Harriston. Our secretary, Mr. Wheaton, visited Maple Grove and spent a day with the makers there. One hundred and thirty-five makers in all attended these meetings and seemed to take a lively interest in the work. Although the attendance was not as large as that of last season, yet it was not from any lack of interest. One reason for the decrease in attendance was that the time devoted to this work was shorter than last year ; another was that in some places the local press misplaced the dates so that some of the makers were disappointed in this way.

In the months of June and July a great many very inferior cheese were made. There were different causes for this. One I might mention, namely, the low price of cheese ($6\frac{3}{4}$ cts. per lb ) caused the patrons to be indifferent as to the production and care of the milk, a great many not even straining it ; and as to aerating, it was the exception rather than the rule. The result was that a lot of bad flavored, dirty, gassy milk was delivered at the factories. The cheese-makers made their first mistake by accepting such milk, and their second by maturing the milk too much before setting, or by using a large quantity of starter. And what was the result ? A lot of stiff, coarse-textured and badly flavored cheese. I do not mean to say that this state of affairs prevailed amongst the best factories, but in the course of my duties the majority of the cheese I saw in June and July were similar to the description I have given. I would ask dairymen, both patrons and makers, to bear in mind that the *lower* the price of the product the *closer* the inspection. Such has been the case during the past season and always will be. We should do our best at all times and especially when the prices are low, and try if possible to create a demand above all others for *Canadian cheese*. We will only succeed when patrons and makers work together for the advancement of this industry.

I tested 572 samples of milk with the Quevenne lactometer and 462 samples with the Babcock milk tester. Of these one sample tested one per cent. of butter-fat, fourteen samples between one and two per cent., fifty-five samples between two and three per cent., 303 samples between three and four per cent., eighty-two samples between four and five per cent., four samples between five and six per cent., two samples between six and seven per cent., and one sample at seven per cent. I did not get the specific gravity of the one per cent. sample as it was a composite test, but some time after I tested a sample of milk sent by the same patron when the specific gravity was 38, and the butter-fat 1.8 per cent. ; solids not fat 9.95 per cent. The high specific gravity and low per cent. of butter-fat show clearly that cream had been taken from the milk. In another sample the specific gravity was 19.7, butter-fat 2.5 per cent., and solids not fat 5.55 per cent. ; this sample showed that 42 per cent. of water had been added. The richest sample I received for inspection gave a specific gravity of 34.1 per cent., butter-fat 7 per cent., solids not fat, 10.27 per cent., and total solids 17.27 per cent.

Samples of milk taken from the vats during the months of April and May tested from 3 to 3.5 per cent. of butter-fat, in June and July 3.2 to 3.6 per cent., in September 3.4 to 3.5 per cent., and in October and November 3.7 to 4.2 per cent. of butter-fat. In the fore part of the season the quality of the milk remained about the same per cent. of fat as that of last year, but after the 1st of September an excellent quality of milk was produced, the per cent. of fat being higher and the solids not fat much higher than ever before in my experience as inspector. The result was that the average during the last three months of the season was much better than that of a year ago.

I am glad to be able to report that the number of patrons who are inclined to tamper with the milk is growing less, and when you do have to ask one to appear before a justice of the peace, as a rule he will ask why doesn't the company pay for milk according to quality? So when these people ask for this system to be put in practice surely we are approaching the time when all factories both small and great will pay for milk according to its value.

I visited the farms of fifteen patrons to get samples of milk as taken from the cows. Thirteen of these patrons were requested to meet me before a justice of the peace. Compared with the twenty-one cases of last year and the thirty of the year before you will notice that this tampering with milk is on the decrease. Of the thirteen, twelve pleaded guilty to the various charges and were fined from $5 to $20 with costs. The remaining one pleaded not guilty, had a hearing, was convicted and fined $5 and costs, $17.07. He then appealed to the county judge at London.

The decision in this case was given on February 9th, and the appeal was not granted, the appellant being taxed for costs.

Ten of these charges were for taking cream, two for taking cream and adding water, and one for diluting with water. Two of these cases were in the county of Essex, one in Lambton, one in Middlesex, one in Oxford, one in Perth, three in Waterloo and four in Haldimand.

It will be noticed that each year the time taken up with milk testing is growing less, and that more of the time is devoted to giving instruction in cheese making.

I am sorry to note that the system of paying for milk according to quality does not seem to be gaining much ground, but holds about the same position it did two years ago. The same may be said of the system of returning the whey in the milk cans, though it means a loss of many thousands of dollars to the dairymen of this Province each season. When the consumer demands a fat, meaty cheese with a perfect flavor how are you going to get it? Not while the whey is being returned in the milk cans. I have been called to several factories during the past season where the cheese had been rejected. After examining everything closely I concluded, in many instances, that the condition of the milk as received was at fault, and on going to the president or salesman of the company he would admit that some of the patrons were leaving the whey in the cans till evening. As long as the whey is returned in the cans we will have this difficulty to contend with.

The directors have requested me to give a report of each factory that I have visited. I do so in as short a form as possible.

GROUP I.

| No. | Buildings. | Cleanliness. | Appearance. | Finish of cheese. |
|---|---|---|---|---|
| 1 | Fair | Fair | Untidy | Fine. |
| 2 | " | " | " | Rough. |
| 3 | " | Clean | Tidy | Medium. |
| 4 | First-class | " | " | Fine. |
| 5 | Fair | " | " | Medium. |
| 6 | " | " | " | " |
| 7 | Poor | Fair | Untidy | " |
| 8 | Fair | Clean | Tidy | Fine. |
| 9 | " | " | Untidy | Medium. |
| 10 | " | " | Tidy | Fine. |
| 11 | " | Fair | " | Medium |
| 12 | " | Clean | " | Fine. |
| 13 | " | " | Untidy | Rough. |
| 14 | Poor | Fair | " | Medium. |
| 15 | Fair | " | " | " |
| 16 | " | Clean | " | Fine. |
| 17 | Poor | Dirty | " | Rough. |
| 18 | Fair | Clean | Tidy | Fine. |
| 19 | " | " | " | " |
| 20 | " | " | " | " |
| 21 | " | " | " | " |
| 22 | " | Dirty | Untidy | Medium. |
| 23 | " | Fair | " | " |
| 24 | " | " | Tidy | Fine. |
| 25 | " | Clean | " | Medium. |
| 26 | " | " | " | Fine. |
| 27 | " | " | " | Medium. |
| 28 | Poor | Dirty | Untidy | Rough. |
| 29 | Fair | Clean | Tidy | Fine. |
| 30 | " | " | " | Medium. |
| 31 | " | " | " | Fine. |
| 32 | " | " | " | Medium. |
| 33 | " | " | " | " |
| 34 | " | Dirty | Untidy | Rough. |
| 35 | " | Clean | Tidy | Fine. |
| 36 | " | " | " | Medium. |
| 37 | " | Dirty | Untidy | Rough. |
| 38 | Poor | " | " | " |
| 39 | Fair | Clean | Tidy | Fine. |
| 40 | Poor | " | " | Medium. |
| 41 | Fair | " | " | " |
| 42 | Poor | Fair | " | " |
| 43 | Fair | Clean | " | Fine. |
| 44 | " | " | " | " |
| 45 | " | Fair | Untidy | " |
| 46 | " | Clean | Tidy | " |
| 47 | " | " | " | Rough. |
| 48 | First-class | " | " | Fine. |
| 49 | Fair | Dirty | Untidy | Rough. |
| 50 | " | Clean | Tidy | Medium. |
| 51 | " | " | " | " |

Out of these fifty-one factories only two are in first-class condition, forty-two of them fair, and seven in very poor or bad condition. Thirty-four of them are classed as clean, ten as fair and seven dirty, thirty-two tidy in appearance and nineteen untidy. As to finish of cheese twenty-one are reported as fine, twenty-one medium and nine rough.

The factories in Group II. were visited in regard to the curing of fall cheese, when I noted the following points:

GROUP II.

| No. | Cleanliness. | Appearance. | Finish of cheese. | Temperature. | Moisture. |
|---|---|---|---|---|---|
| | | | | degrees. | p. c. |
| 1 | Clean | Tidy | Fine | 65 | |
| 2 | Fair | Untidy | " | 66 | |
| 3 | Clean | Tidy | Medium | 62 | |
| 4 | " | " | Fine | 68 | |
| 5 | " | " | " | 62 | |
| 6 | " | " | " | 52 | |
| 7 | " | Untidy | Medium | 58 | |
| 8 | Fair | " | " | 53 | |
| 9 | Clean | Tidy | Fine | 55 | |
| 10 | Fair | Untidy | " | 65 | |
| 11 | " | Tidy | Medium | 62 | |
| 12 | " | " | Fine | 64 | |
| 13 | Clean | " | " | 62 | |
| 14 | " | " | " | 62 | |
| 15 | " | " | Medium | 70 | |
| 16 | Dirty | Untidy | Rough | 58 | |
| 17 | Fair | " | Medium | 56 | |
| 18 | Clean | " | Fine | 72 | |
| 19 | Fair | " | Medium | 55 | |
| 20 | Clean | Tidy | " | 54 | |
| 21 | " | " | " | 61 | |
| 22 | " | Untidy | " | 62 | |
| 23 | " | Tidy | Fine | 67 | |
| 24 | " | " | " | 62 | |
| 25 | Fair | Untidy | Medium | 70 | |
| 26 | " | " | Rough | 64 | |
| 27 | " | " | Medium | 66 | |
| 28 | " | " | Fine | 58 | |
| 29 | " | " | Rough | 52 | |
| 30 | " | " | " | 64 | |
| 31 | " | " | " | 52 | |
| 32 | Clean | Tidy | Medium | 60 | 50 |
| 33 | Dirty | Untidy | " | 52 | 25 |
| 34 | Clean | Tidy | Fine | 66 | 32 |
| 35 | " | " | " | 60 | 38 |
| 36 | " | Untidy | Medium | 61 | 25 |
| 37 | " | Tidy | Fine | 55 | 40 |
| 38 | Very clean | " | " | 60 | 45 |
| 39 | Fair | Untidy | " | 65 | 40 |
| 40 | Clean | Tidy | " | 70 | 35 |
| 41 | " | " | Medium | 60 | 35 |
| 42 | Very clean | " | Fine | 65 | 35 |
| 43 | Clean | " | " | 62 | 40 |
| 44 | " | " | " | 60 | 40 |
| 45 | " | " | " | 60 | 45 |
| 46 | " | " | Medium | 58 | 28 |
| 47 | Fair | Untidy | " | 53 | 28 |
| 48 | Dirty | " | Rough | cold. | 28 |
| 49 | Clean | Tidy | Medium | 56 | 25 |
| 50 | " | " | " | 66 | 35 |

Some of the factories I visited were locked. The cheese-maker was having his day off and the cheese were given a taste of cold storage.

In group II. two are reported very clean, twenty-nine clean, sixteen fair and three dirty. In appearance twenty-nine are tidy and twenty-one untidy. As to finish of cheese twenty-four are fine, twenty medium and six rough. The temperature of curing rooms in one was *cold*, no fire in the room and the door open on December 5th, and sixteen were between 52° and 58°, twenty-nine between 60° and 68°, three at 70°, and

one at 72°. The proper temperature for curing fall cheese is from 60° to 65°, and to attain best results an *even* temperature must be maintained. The amount of moisture in the curing rooms varied from 25 to 50 per cent.; twelve out of nineteen showed less than 40 per cent. Prof. Dean, of the Ontario Agricultural College, says that the proper amount of moisture is about 60 per cent. In October and the fore part of November the amount of moisture was about right, and I did not make a note of the different percentages, but in the latter part of the month and December, as the weather grew colder, I found the moisture to be less in every case and advised the cheese-makers to place a pan of water on the stove, also to sprinkle the floor with water. In a few cases I found the cheese checking under the bandages on account of the dryness of the atmosphere.

REPORT OF SYNDICATE FACTORIES.

| No. | Cleanliness. | Appearance. | Finish of cheese. | Temperature. | Moisture. |
|---|---|---|---|---|---|
| | | | | degrees. | p. c. |
| 1.... | Clean | Tidy | Fine | 42 | 15 |
| 2.... | Fair | Untidy | Rough | 54 | 30 |
| 3.... | Clean | " | Medium | 50 | 20 |
| 4.... | " | " | Fine | 60 | 30 |
| 5.... | " | " | Medium | 56 | 30 |
| 6.... | " | Tidy | Fine | 60 | 20 |
| 7.... | Dirty | Untidy | Rough | 52 | 32 |
| 8.... | Fair | " | " | 56 | 30 |
| 9.... | Clean | " | Fine | 51 | 30 |
| 10.... | Fair | Tidy | Rough | 58 | 42 |
| 11.... | Clean | " | Fine | 60 | 45 |
| 12.... | " | " | " | 60 | 50 |
| 13.... | Dirty | Untidy | Rough | 46 | 50 |
| 14.... | Clean | Tidy | Medium | ..... | ..... |
| 15.... | " | " | Fine | ..... | ..... |
| 16.... | " | " | " | ..... | ..... |

The report of the last three is rather incomplete. I did not see these factories, but had the report handed me.

Summing up, we find eleven of these sixteen factories classed as clean, three as fair and two as *dirty*; in general appearance eight as tidy and as many untidy. In finish of cheese we have eight as fine, three medium and five *rough*. In temperature we have a wide range from 42° to 60°, one at 42°, one at 46°, six between 50° and 56°, and five between 58° and 60°. As to moisture, when the hygrometer should register 60 per cent. I found one as low as 15 per cent., two at 20 per cent., six from 30 per cent. to 32 per cent., two from 42 per cent. to 45 per cent., and two at 50 per cent. Up to the present time the amount of moisture in the curing rooms has not received due attention. In all the factories I have inspected I found only one hygrometer for measuring the amount of moisture in the atmosphere. The most of the cheese in the factories when I inspected them were uniform in quality and making, but too many of them were not finished as well as they should have been. Judging from what I saw during my tour of inspection, I would say that Mr. J. B. Muir, the instructor, did good work.

I am very sorry to say that a number of our factories were not as clean during the past season as they should be, or as they *must* be if they wish to succeed. One reason for this is that factorymen have been cutting down the price for making, and as a natural result the maker is trying to get along with less help so that some part of the work has to be neglected. Others are careless and dirty, and do not care how things are as long as they can get through the *dirt* without sticking to it. Last July I was called to a factory where the cheese had been rejected, and they wanted to know what was the cause. I could tell them almost as soon as I saw the inside of the making-room. The

secret of the whole trouble was *dirt, dirt.* I said to the maker: "The first thing you have to do is to clean your factory and everything in it—vats, sinks, sink-covers, strainers, presses, etc." This is rather a hard thing to say, and I often think it hurts me more to say it than it does those lazy fellows I have to say it to, but I would say right here if a man is not *clean* in himself and about his work he has no place in a cheese or butter factory, and so long as he remains there he will never be a success. To be successful dairymen we must not only apply all the skill at our command, but exercise the greatest cleanliness from the feeding of the cow all through the process until the cheese is placed on the consumer's table. I would not have anyone go away with the idea that all the dirty factories are in the western part of Ontario; the same state of affairs you will find existing both east and west. I would urge the managers of cheese and butter factories to pay the maker a fair equivalent for his services; and then expect good work and a well kept, clean factory. Unless a maker does this he is dear at any price.

The whey tanks at a great many factories are positively dirty. Some of them have not been thoroughly cleaned since the tanks were built, and all they are good for in their present state is to destroy whatever feeding value there is in the whey, and to make an excellent breeding place for all sorts of bacteria of the worst description. The tanks should be thoroughly cleaned at least once a week.

Only a small percentage of the factorymen pay due attention to the sanitary condition of their factories and surroundings. Very often you will find the floors and gutters leaking, and a pool of rotten whey under the factory, or probably the waste-water drain has been choked so that in the yard within a few feet of the factory a cess-pool is formed. You may go to the president of the company and urge him to attend to this matter, and he will say that it must be attended to at once; but go back in a month and quite often you will find things as you left them. I would ask this Association to endeavor to bring about some means by which this *evil* may be remedied.

During the latter part of the season in almost every factory I visited the cheese were showing bad flavors, such as apple, rape, turnip, etc., thereby reducing the value from one to two cents per pound. The patrons are responsible for this. If they will persist in feeding such food to their milch cows they must expect to find the same flavor in the finished product and must accept a low price for the same. How much better would it be if the patrons would feed corn and mangels, which would produce just as much milk and of a much better quality and flavor?

In the latter part of September I spent a week conducting and assisting with dairy tests at the Southern Fair, Brantford, and at the Huron Agricultural Fair held at Ripley. I am very much pleased to see this step made, and although we had only a few entries last fall, in the near future I hope to see keen competition in these contests. I would like to see special prizes offered for dairy cows at every fair, or at least at one fair in each county, offering a premium for the best dairy cow in the county. At the Fat Stock Show at Guelph last December there was a splendid exhibit of dairy cows, twenty competing, an increase of almost fifty per cent. over that of a year ago. This is very encouraging for the promoters of this movement, and should be an inducement for others to bring out their cows and in this way let the public know what they are doing.

I take this opportunity of thanking the officers of this Association and dairymen for their assistance and kindness to me during the past season.

### Report on Syndicate Factories.

No. 1. Factory was clean and tidy. Cheese were well made, very clean, nicely finished, uniform in size, and presented a fine appearance. A few lots showed apple flavor and others turnip. The cheese were curing slowly. Curing-room heated by a large box-stove registered 42° temperature and 15 per cent. moisture.

No. 2. This factory was fairly clean but very untidy. Cheese were well made, uniform in size, but roughly finished, and presented an untidy appearance. A few lots showed apple flavor. Cheese was curing fairly well. The curing-room, heated by a large box-stove, had a temperature of 54° and of moisture 30 per cent.

No. 3. Factory was clean but rather untidy, as they were just cleaning up at the close of the season. The cheese were well made and fairly well finished; a few lots showed turnip flavor. Cheese were curing slowly. The curing-room, heated by a large box-stove, had a temperature of 50°, moisture 20 per cent.

No. 4. Factory was clean but rather sloppy and untidy, and with no fire in the making-room, though a very cold day. Cheese were clean, neatly finished and of uniform size. Curing-room heated by wood furnace, had temperature of 60° and moisture 30 per cent.

No. 5. Factory was clean but rather untidy, having a fire in the making-room. Cheese were well made, clean, uniform in size, but only fairly well finished, there being a few bare shoulders and a few of the bandages wrinkled on the side. A few lots showed turnip flavor, but on account of the room being so cold could not say much about the flavor. The curing of the cheese was slow. The curing-room was heated by a large box-stove, the temperature of room being 50°, with moisture 30 per cent.

No. 6. The factory was clean and tidy, and had a fire in the making-room. Cheese were fairly well made, though they seemed a little short in texture. They were uniform in size, of perfect finish, clean and looking fine. A few lots showed apple flavor and one or two turnip. They were curing nicely. Curing-room had temperature of 60°, with moisture 20 per cent. Coal and wood stoves were used.

No. 7. Factory was dirty and untidy, with no fire in making-room. Cheese were fairly well made, but roughly finished, having bare shoulders and wrinkled bandages. A few lots showed turnip flavor. The cheese were curing slowly. The curing-room, in which the shelves were dirty, was heated by two small box-stoves, and had a temperature of 50° with moisture of 30 per cent.

No. 8. Factory was fairly clean but untidy, and with no fire in making-room. Cheese were fairly well made, quite a number being a little open, but they were roughly finished, having an untidy appearance and bare shoulders. A few lots showed turnip flavor and others apple. Shelves were dirty. Cheese curing slowly, being very cold. Curing-room at 56°, temperature and moisture 30 per cent.; was heated by a coal stove.

No. 9. Factory was clean but very untidy. Cheese were well made, clean, tidy and nicely finished. Quite a number of November make showed turnip flavor, and that of October, apple. Cheese were curing slowly. The curing-room, with temperature at 51° and moisture 30 per cent., was heated by coal stove.

No. 10. Factory was fairly clean and tidy. Cheese were well but roughly finished as to shoulders and wrinkled bandages. The cheese showed turnip and apple flavors, and were curing fairly well Curing-room with temperature 58° and moisture 42 per cent. Was heated by a box-stove.

No. 11. Factory clean but rather untidy. Cheese were well made, nicely finished, clean and looking fine. Some, however, showed apple flavor. They were curing nicely. Curing-room, heated by box-stove, had a temperature of 60°, with moisture 45 per cent.

No. 12. The factory was clean and tidy, with fire in making-room. Cheese were well made and nicely finished, with a few showing turnip and apple flavors. Cheese were curing nicely. The curing-room, heated by a coal stove, had a temperature of 60°, moisture 50 per cent.

No. 13. The factory was dirty and untidy. Cheese were fairly well made but roughly finished, showing apple flavor. Cheese were curing unevenly. Curing-room was heated by a box-stove, with fire almost out. The temperature of the room was 46° and moisture 50 per cent.

Mr. JOHN BLAYNEY: Is there any bad effect from feeding carrots or parsnips?

Mr. MILLAR: I never heard of any.

Mr. BLAYNEY: I am fully satisfied that there is no advantage in feeding turnips. I can get more out of corn and mangels and carrots than I can get out of turnips. Last year I did not feed any turnips at all, and still I had to put up with those who fed tur-

nips and those who fed apples. I do not think it was generally known that apples would hurt milk but it seems that has been the case, and the cheese has had a bad flavor. I did not feed apples, but I suffered from other parties doing so. I am fully satisfied that there is no advantage in raising turnips to make cows give milk when you can raise corn and carrots and mangels. These things can be raised equally as cheap, and you can procure from them a great deal more fodder ; I do not think it pays to raise turnips. I prefer corn.

Mr. JOHN MCFARLANE : Does corn taint the milk ? Is there any way of feeding turnips without tainting the milk ?

Mr. MILLAR : The only way is not to feed them.

Mr. JOHN MCFARLANE : I know better, for I feed them all the time.

Mr. MILLAR : Then you have turnipy flavor ?

Mr. MCFARLANE : There is no use telling me that, for I feed them all the time.

Mr. MILLAR : There is a difference of opinion.

Mr. MCFARLANE : I know better, for I have tried it.

Mr. TUTTLE : Would it be too personal to ask who these makers are, who make poor cheese and keep dirty factories ? Would it not be better for the inspector to report their names instead of keeping it all to himself ?

The SECRETARY : The list will be published in the report of the Association.

The PRESIDENT : That matter will be discussed, and it will be for this meeting to decide as to whether it would be right to publish these names or not.

Mr. TUTTLE : What is the good of that report if we do not know the names ? If we were going to hire a cheese-maker, we would like to know whether that man is a dirty man or not. Hear, hear.)

Mr. JOHN H. WOOLEY : I think it would be rather hard to do that at this time. I think it would be well to say that it would be done in the future. I think it would have a good effect.

The PRESIDENT : I would like to have the opinion of the cheese-makers as to publishing these names. This is the place to thrash this thing out. Do not be afraid to speak out and ask questions.

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## SECRETARY'S REPORT.

GENTLEMEN,—I have pleasure, as your Secretary for 1896, in presenting my fourth annual report.

The work carried on by the Association and its officers during the year has been characterized by the usual vigor, and the various branches of the work made as effective as possible in promoting the welfare of the dairy industry of Western Ontario.

The number of annual and local dairy meetings attended was much larger than during the previous year. Addresses were given at Nixon, Becher, Thamesford, Embro, Beachville, Rothsay, Lavender, Bornholm, Rockford, Villa Nova, Freelton, Tilsonburg, Hickson, Burnside, and Listowel, as well as at the local conventions and one or two other gatherings of dairymen. The subjects discussed at these gatherings were chiefly the care of milk for cheese-making and the importance of making only the finest quality of dairy products. Your President and 1st Vice-President rendered valuable assistance at a couple of these meetings. The interest in this branch of the work seems to be increasing. Several applications have already been received for attendance at annual and local meetings during the present winter. There is great need of educating the patrons of many of our cheese and butter factories in the proper care of milk, and the annual and local meetings seem to furnish an excellent opportunity for reaching them. The

services of your Secretary can be secured when available, by paying his travelling expenses from London to the place of meeting and return or by securing enough members' fees for the Association to cover them.

A meeting of cheese and butter-makers was held at the Dairy School, Guelph, on March 6th, under the auspices of the Provincial Dairy School, the Ontario Creameries' Association and the Western Dairymen's Association. 1,000 programmes were issued to advertise this meeting, and sent out by your Secretary to the cheese and butter-makers. This gathering was largely attended by the cheese and butter-makers of Western Ontario, and was productive of much good to those engaged in the business. The addresses and discussions were of a thoroughly practical nature and were delivered chiefly by practical makers. Your President, Mr. A. F. MacLaren, M.P., presided at the afternoon session and Mr. D. Derbyshire, President of the Ontario Creameries' Association, at the evening session. A large share of the success of the meeting is due to Dr. Mills, President of the Ontario Agricultural College, and Professor Dean. Dr. Mills kindly provided luncheon for the visitors at the College. The success of this gathering is such as to warrant the holding of a similar meeting this year. It was purely a makers' meeting, and it is the intention if another one is held to have it continue as such. Arrangements should be made to have a verbatim report taken of the addresses and discussions for the benefit of the makers during the summer, and it is to be regretted that such a report was not secured last year.

Four very successful local conventions were held during February, at Dunnville, Forest, Listowel, and Elmira. There was an afternoon and evening session in connection with each gathering. In nearly every case the halls in which the conventions were held were crowded to the doors during the afternoon session. A good staff of speakers was provided for these meetings, and everything was done to make them as valuable as possible in improving and keeping up the quality of the dairy products made in these respective sections. In addition to the excellent services rendered at these conventions by Prof. Robertson, Agricultural and Dairy Commissioner, Ottawa; and Prof. Dean, Guelph; valuable assistance was given by your President, A. F. MacLaren, M.P., and your 1st. Vice President, Jno. S. Pearce; R. Robertson, London; F. J. Sleightholm, B.S.A., Superintendent Western Dairy School, Strathroy; A. T. Bell, Tavistock; Inspector Miller, Jas. A. Gray, Atwood; Harry White, Hawkesville, and several others.

These local conventions serve to reach those sections where the dairymen are unable to attend the annual gathering and for this reason a limited number should be held each year. As we are to have a reunion of the cheese and butter interests of the Province it would be advantageous for the new organization to hold one or two of these meetings this winter in districts where butter-making is more or less a specialty. As far as possible these meetings should be held jointly with the farmers' institutes.

A much larger number of factories were visited by your Secretary last season than during any other season since assuming his present duties. Visits were made to the following factories on application for the purpose of milk inspection and giving help to the makers: Uttoxeter, Willow Grove, Marion, Beaver, and Wheatly, and to Mr. Wm. Shepherd's creamery at Bothwell, where assistance was rendered in operating the Babcock milk tester and in making up patrons' accounts according to the percentage of butter-fat. Two of these visits were made during Inspector Miller's illness in August. Upwards of seventy visits were made to other factories during the season, chiefly in connection with the cheese factory syndicate, and where opportunity would allow and no extra expense would be incurred. Other visits could have been made, but it was felt that if the factories did not make application one was not justified in incurring any extra expense, especially as the Association had undertaken extra work which would largely increase the expenditure.

The office work of the Association is becoming more important, and the correspondence is increasing every year. During the year 900 letters were received and over 1,200 written in connection with the Association's work. This is fully twenty-five per cent. more than the number written last year. In addition to the programmes sent out to

advertise the cheese and butter-makers' meeting, 1,000 circulars were mailed to the cheese-makers and factorymen early in April, setting forth the policy and work to be carried on by the Association during the season. The plan of sending out to the press articles bearing upon the Association work was continued. By means of a copying process, copies of eighteen different articles were sent to about seventy newspapers circulating in the west. As far as we can make out these articles were published in nearly every case, and if each article was read by 100 persons there would be a grand total of 126,000 persons reading something referring to the Association's work at various times during the year. This illustration will give some idea of the importance of this work.

A form of agreement for use between cheese-makers and factories, with recommendations to factorymen, was compiled during the year. Two thousand copies were issued and a copy sent to the secretaries of factories and cheese-makers during August. In this agreement the duties to be performed by the makers and companies in manufacturing cheese are set forth in detail. The need of some standard form of agreement will be apparent to anyone who knows the manner in which many of the engagements between makers and factorymen are made. We are pleased to state that many of the forms sent out are being utilized, and that there has been considerable enquiry for copies. A supply is kept in the Association's office and copies will be mailed free to factorymen and makers on application to the Secretary. A circular letter was sent out in November to the officers of the sister dairy associations of the Province and to the staffs of the Agricultural Colleges, Experimental Stations and Dairy Schools inviting them to be present at the convention. Five thousand thirty-two page programmes to advertise this gathering were also issued and sent out to the dairymen and farmers at the end of the year. In these programmes we have secured enough select advertisements to pay for the cost of printing and mailing. In addition to advertising the convention we desire as far as possible to make this programme a medium for dealers in dairy supplies, etc., to reach the makers and dairy farmers, and trust that we shall have their co-operation in doing so.

The membership of the Association last year was 453. This is not what it should be. With the territory it covers and with the number of persons under its jurisdiction, there should be a membership of at least as many thousands as we now have hundreds. But it is very difficult to get dairymen to realize this, and unless a personal canvass is made—and there is no opportunity of doing this except at local meetings—the number is not likely to be much larger than it is at present. Then, again, we have to contend with the fact that dairymen can get the literature supplied by the Association through the farmers' institutes at one-half the cost of becoming a member of the Association. Dairymen should realize, however, that the small fee of fifty cents required to become a member goes to carry on the good work the Association is doing, and that they get it back ten-fold in the instruction and the information furnished to factorymen, makers and others during the year. Let me here urge upon all the old members to join again this year, so that the new members we get by holding the convention in a new section will not have to go to supply the places of the old ones, but to increase the total. A list of cheese and butter-makers is kept in the Association's office, and we trust that makers will notify us when their addresses are changed.

The same line of instruction in central factories during April and May, and the regular work of visiting factories on application as in the year previous, was continued last year, as the report of Inspector Millar will show. The number of applications received for the Inspector's services was considerably less than the year previous, and the revenue from that source was fully thirty per cent less. There were thirty-four applications in all, twenty-nine of which were visited by Inspector Millar, and the balance by your secretary. There were a couple of applications from factories for milk inspection that had no Babcock tester and consequently were not visited. It was considered advisable by your board that the inspector should only inspect such samples of milk as from a previous test were considered to have been tampered with. The revenue from fines for tampering with milk also shows over thirty per cent. decrease. This is a source for congratulation, as it indicates that the practice of tampering with milk supplied to our cheese factories is decreasing, and no one connected with the Association desires to see a very large revenue

from this source. Fully ninety nine per cent. of the fines imposed were made during October and November, which shows that the guilty parties must have concluded that as the end of the season approached they would not be watched so closely. In this particular the inspector's work has been made more effective by publishing the names of the convicted parties. We have made a practice of doing this for the last few years, and we believe that it is as good as a $50 fine, and that by making public the names of those who have been found guilty of supplying deteriorated milk others are deterred from doing so for fear the inspector will drop in on them at any time.

Though there is an urgent need at the present time for more instruction in making, the experience of the past few years shows that our factorymen are not willing to pay a fair share of its cost. An amount less than $200 is a very small portion for the factories in Western Ontario to pay for this purpose. It is claimed by some that the factories should be visited free of cost by the Association. This is practically impossible with the present resources we have. There are at least 350 cheese factories in the territory looked after by this Association, and if the visits of the inspector were free one factory would have as good a right to his services as another. To make a visit to each factory during the season, July and August, when instruction is most needed, at least eight instructors would be required, and to pay their salaries and expenses would require almost three times as much money as the Association now has at its disposal for that purpose. I have given this question a more or less close study during the last year or two, and have come to the conclusion that if the work of instruction in the factories is to be carried on the factorymen must pay a fair share of the cost. This could be done quite easily and without imposing any great burden upon them. If each factory would pay $10 a year, or if a tax of fifteen cents a year were imposed upon every patron of a cheese factory in Western Ontario, the Association would have enough revenue to employ a sufficient number of instructors so that each factory would receive a visit nearly every month during the cheese making season. The good that would result to the industry if such a system of instruction were carried out cannot be too highly estimated, and we trust that factorymen will consider it carefully. The factorymen in Eastern Ontario set us a good example in this respect. In 1895 they contributed $1,844.10 for instruction in the factories, which, together with the amount received from fines, made over $2,300 which the Eastern Association had, in addition to its own revenue, to spend upon instruction in the factories. It will be interesting for you to know that last year the Western Association with only two instructors paid out of its grant for instruction in the factories, within $150 of as much as the Eastern Association paid out of its grant in 1895 for the same purpose where five instructors were employed. I mention this to show you that our Association, though it carries on a lot of extra work, and has an officer who devotes his whole time to looking after its interests, expends nearly as much of its revenue for instruction in the factories as do our friends in the east where this extra work is not performed.

As the report of the directors shows, your board took some action in regard to the sanitary condition of cheese and butter factories last year. Anyone visiting our cheese factories during the summer months will be forcibly impressed with the very poor sanitary arrangements that many of them have, and the utter disregard manifested in regard to the public health. The need of some means of remedying this is evident. As to the best method of doing it there will be a difference of opinion. It has been suggested that the inspectors employed by the associations be made officers of the Provincial Board of Health, and that a tax be imposed upon each factory for this purpose. This would be a simple way of regulating the matter, and would serve the double purpose of instruction in making and sanitary inspection at the same time.

There is one other important feature of the past year's work to be dealt with. At a meeting held on January 20th your board of directors decided to organize one or two syndicates of factories for the purpose of more uniform instruction and inspection, and several groups of factories were selected for this purpose. Mr. H. White, one of your directors, and your Secretary, were appointed a committee to meet the directors of a number of factories in the Woodstock and Ingersoll districts and lay before them the

proposed scheme. Meetings were arranged for the representatives of twenty-two factories, but it was found after about one-half of the meetings had been held that a syndicate could not be organized of the factories selected, and the balance of the engagements were cancelled. The chief difficulty in this district, and one we did not anticipate, was that the factories that did not return the sour whey to the patrons in the milk cans refused to go into a syndicate with the factories where the whey was returned. As there were not enough of either kind to form a syndicate, the matter was dropped. On February 27th a meeting of the factories' representatives in the Listowel section was called to consider the advisability of organizing a syndicate in that district. As this meeting was held on the forenoon of the local convention in Listowel, there was a representative gathering. Your President, 1st Vice-President, Mr. R. M. Ballantyne, Mr. H. White, and your Secretary represented the Association, and laid before the meeting the details of the scheme. After a full discussion of the proposal the meeting adjourned to meet again on March 18th. At the adjourned meeting your President, Mr. Ballantyne, Mr. Prain, Inspector Millar, and your Secretary were present, and fourteen factories were represented. The question was again discussed pretty thoroughly. The principal objection to the scheme was the extra expense incurred. Some of the factories took the ground that as the makers engaged to make a first-class article of cheese, they should pay for this instruction if it were necessary. This is an entirely wrong view. If the system brings about a better quality of cheese, which means an advanced price, and we believe it will, the patrons who supply the milk will get the benefit, and therefore should pay for it. After the various representatives had been heard regarding the scheme, the following resolution was moved by Mr. Wm. Squires, af the Willow Grove factory, and seconded by Mr. Hugh Jack, proprietor of the Newton and Carthage factories: "That in the opinion of this meeting it is desirable to establish a syndicate of cheese factories in this district on the plan proposed by the Dairymen's Association of Western Ontario." The vote on the resolution resulted in a tie, and consequently the attempt to organize a syndicate in that section was dropped.

After a large amount of correspondence with groups of factories in various sections, a group of seventeen factories was finally secured that were willing to take hold of the scheme and pay a fixed share of the cost. This group was situated partly in the London and partly in the Ingersoll districts, and consisted of the following factories: Burnside, Avon, Harrietsville, Lyons, Elgin, Yarmouth Centre, Mapleton, Glanworth, Pond Mills, Gladstone, Thames, Dorchester, Thamesford, Cherry Hill, Geary's, Proof Line, and Devizes. These factories agreed to pay sums ranging from $10 to $25, according to the make, or a total of $256, the Association agreeing to pay the balance of the estimated cost, or about $400. The estimated cost was reduced somewhat, the Association finally paying about the same as the factories. All the factories continued in the syndicate till the close of the season, excepting one which desired to drop out earlier in the season. Mr. J. B. Muir, a maker of good standing and long experience was engaged as instructor, and placed in charge of the group. His report will give in detail the work performed by him.

The factories in this group may be taken as a fair average of the factories in Western Ontario. Some of them had a very good reputation as producers of fine cheese before the syndicate was formed. In this group we had makers of from thirty years' experience down to those of four or five years' experience. Four of the factories were controlled by the patrons, and the balance were owned by the makers themselves or some private individual. We also had in this group the largest factory in Canada, which made considerably over 200 tons, down to factories making less than forty tons. The factory buildings in the group may be classed as follows: forty per cent. in fairly good repair, forty per cent. about medium, and twenty per cent. badly in need of repair. The work was hampered considerably, especially during the later months, by insufficient equipment for curing the cheese properly. Only about twenty-five per cent. may be said to have had the proper equipment for maintaining and keeping up an even temperature in the curing-rooms during the cold weather; and here let me say that I believe this percentage to be higher than the percentage of all the factories in Western Ontario having this equipment.

To speak definitely as to results is somewhat difficult, but if any of you could have visited some of these factories before the work of instruction began, as we had the privi-

lege of doing, and afterwards several times during the season, you could not have but noticed that there was a considerable improvement in the style, finish and quality of the cheese made as the season advanced. This improvement was more noticeable where the maker was willing to accept the advice of the instructor. In some cases the makers, though believing that the syndicate was a good thing and thoroughly appreciating the visits of the instructor, would cling to their old ways, and therefore did not improve as much as they should have done. It takes time to educate some people, and I have no doubt that if the same line of work is continued another season a still greater and more general improvement will be noticed. One of the special ways in which improvement was noticed was more uniformity in the make. In December I accompanied Inspector Millar on a visit to over one-half the factories in the group. Over 7,500 cheese were seen on this trip, which were very uniform in quality with the exception that some of them were better cured than others. Had it not been for the bad finish on some of the lots—which is nearly altogether due to the taste of the maker and how he has been brought up—it would have been difficult to find any difference in the making of the whole lot.

The testimony of the makers and factorymen in the group will be of more value as to results than anything I could say. Mr. Robert Facey, Harrietsville, a gentleman of long experience in the business and the owner of the largest factory writes:

"I am a member of the cheese factory syndicate, organised by the Association last spring, and my factory at Harrietsville has received visits regularly from the syndicate instructor, Mr. J. B. Muir, during the past season. I consider the scheme an excellent one, and just what is needed to bring about a greater uniformity in the quality of our western cheese. A competent instructor and inspector visiting a group of factories at regular intervals during the season, is able to give help to the makers and to point out mistakes and wherein their methods might be improved upon. I am well satisfied with the work of the syndicate so far and trust that it will be continued another season."

Mr. Samuel Barr, secretary of the Burnside Cheese Co., writes: "I think the syndicate scheme was a step in the right direction, and I believe our factory has derived benefit from it."

Mr. Wm. A. Brodie, maker at the Glanworth factory, writes: "I think the scheme is a good one if the makers will follow the instructions given. I have derived considerable benefit, and am willing to join again if there is one under Mr. Muir's instruction."

Mr. T. C. Mallory, proprietor and maker at the Yarmouth Centre factory, says: "I am pleased with the work of the syndicate instructor and think the scheme is all right. I consider the instructions which I have received as valuable, and think I am well repaid for the outlay. I would like to see the syndicate continued next year, and if the fees are not too high will join again. I also think Mr. Muir is the right man in the right place."

Mr. Chas. Luton, maker, Lyons factory, writes: "I am well pleased with the syndicate and hope it may continue next summer, and that I may be in it with Mr. Muir at the head."

Mr. Chas. Jenkins, maker and proprietor of the Thamesford factory, also says: "I like the syndicate and think it is just the thing needed, and would like to see it continue next season with the same instructor."

A number of other makers and factorymen in the group, interviewed personally, spoke very favorably of the scheme. Among these may be mentioned Mr. John Geary, London, an ex-President of this Association; Mr. J. A. James, Nilestown; and Mr. J. W. Scott, Sparta. With one or two exceptions, those particularly interested spoke very favorably of the scheme and hoped it would continue another season. One salesman said that the syndicate had been a god-send to their factory.

It will thus be seen that the syndicate scheme has had a fair trial and has shown itself capable of bringing about a more uniform and better quality of cheese. Though the results obtained have not been as great as its most enthusiastic advocates hoped for, yet they have been very satisfactory considering the difficulties connected with testing the scheme, and if the same system is continued another year, I have no doubt but very much better results will be obtained. The number of factories in the group might be nearly

doubled with advantage, as it is not necessary for the instructor to spend a day in each factory on a visit if the maker is getting along all right. He could visit three or four in a day, and therefore make one visit to as many as twenty-five factories every fortnight. By increasing the number of factories the cost to each factory would be lessened.

As stated in the directors' report, there were a number of applications last year for the Association officers to arbitrate in cases of dispute between buyers and sellers of cheese. It would not be advisable for the Association to take up this work, but a somewhat similar line of work might be undertaken. A great many cheese are rejected at the factories by the buyers because of bad flavors. In the majority of cases, the maker should not be held responsible for bad flavors in cheese where patrons will persist in feeding their cows foods, such as turnips, rape, etc., that will taint the milk and cheese; the loss sustained should fall upon the proper parties, who are the patrons, and not the makers. Therefore a good line of work might be done by having the Association's instructors and officers, or some competent persons appointed for the purpose, make an examination of rejected cheese and report as to whether the maker is to blame or not, and if so, to what extent. Something of this kind is urgently needed, as we believe many of our makers have to pay for bad cheese they are not responsible for. If such a system of arbitration were provided for, and the loss sustained from bad flavored cheese saddled upon the proper parties, we feel confident that it would do than anything else to secure a better quality of milk at the factories.

Before closing this report, I would like to say a few words in regard to the financial position of the Association. As the financial statement shows, the balance this year is on the wrong side, and the liabilities of the Association are a little in excess of the assets. This has been largely due to the fact that there was considerable extra expenditure in connection with the syndicate scheme. Besides the expenses of the last convention, the Directors' expenses and the travelling expenses of the inspector were considerably increased, and at the same time there was over thirty per cent. decrease in the revenue from factory fees and fines. Therefore by the Association having increased expenditures to meet and less revenue with which to meet them, the small deficit is easily accounted for. The extra expenditures, however, have all been along the line of progress and definite effective work can be shown for every item expended.

There are are several other matters connected with the year's work that I should like to touch upon had I the time, but as my report is already a lengthy one, I will not trespass any further upon your time.

With sincere thanks to the Directors and members of the Executive Committee for their continued kindness during another year, I am,

Your obedient servant,

London, January 18th, 1897. J. W. Wheaton.

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A Member: Do I understand that if each factory patron paid 15 cents that it would be sufficient so that an inspector could be appointed?

The Secretary: The statement I made was this, that if each patron in Western Ontario were to pay 15 cents to the Association, we would have enough funds to employ a sufficient number of inspectors or instructors, so that a visit could be made to each factory at least once a month.

A Member: I think in place of paying 15 cents that if a man who runs a factory does not know enough to make cheese or run it properly the factory ought to be shut up and there would be no need of paying even 15 cents a patron.

A Member: The maker may know how to do it and at the same time he may be handicapped, and I think it would be a good thing to have an inspector, and I think 15 cents is very little to pay for such a service.

The CHAIRMAN: I find that the man who thinks he knows it all does not know anything. We are all capable of learning something from each other.

A MEMBER: Is it possible for a competent cheese-maker to know bad milk?

The CHAIRMAN: I don't think so, at all times. I think, particularly in the fall of the year, that unless he heated a cupful of the milk he would not be able to detect the bad flavor. I would suggest that with regard to the turnipy milk and apple milk, and rye and rape milk, there ought to be some system of heating a cup full of this milk, and then you could detect the patrons who are feeding these things. I think it is a great shame that patrons who are sending in good milk should suffer by reason of some patron sending in bad milk.

Mr. MCFARLANE: All these things can be fed equally well if they know how to feed them, and if they will come to me I will show them. I feed everything that grows.

Mr. JOHN BLAYNEY: About the 15 cents—would that be on the sliding scale, some factories are larger than others?

Mr. WHEATON: There are about twenty-three thousand butter and cheese factory patrons in Western Ontario. You can judge yourself as to the revenue that would be raised from that source if each one paid 15 cents.

Mr. MONRAD: I think 15 cents from each patron would be money well spent and I think that suggestion should be forcibly put upon the mind of everyone.

Mr. JOHN MARSH, Bruce County: Fifteen cents from each patron of our cheese factory would have amounted this year to about $20, and the patrons of Elderslie cheese factory lost $500 this fall through bad cheese. Our cheese-maker made some mistake in curing, and we just lost $500 on the cheese. Had we spent $20 to have an instructor once a month, he might have kept us straight.

Mr. PATTULLO: I think this is one of the questions that this convention ought to seriously consider. Fifteen cents from each patron of a cheese factory is a very small amount; probably no patron in any part of the country would miss that amount. If it were only 10 cents it would amount to a very large sum. It would not be much from the patrons of a particular factory, but all over the country it would amount to a large sum, and it would enable the Dairy Association to do better work for you than they have been able to do in the past. Here is the difficulty—how is that sum to be collected? Would dairymen of this country ask that the Association should have the power to collect a sum up to the limit of 15 cents from each patron through the secretary or treasurer of the factory? Limiting the sum to 15 cents, they should be able to collect 5, 10 or 15 cents as they deem necessary. That is a question which I think you ought to consider at this convention. A gentleman here spoke about publishing the names of the delinquent makers in these factories that were not found to be as clean as they should be. I entirely sympathise with what I understand to be the purport of his remarks, but I think there is much difficulty in the way, and that is the reason why I rise at the present time to point it out. This Association occupies a big space, and our inspectors are not health officers, and all the factories in this country are not inspected by Mr. Millar or Mr. Muir, or anyone at all. Would it be entirely fair that the factories that have been inspected and that have been found not up to the mark in their sanitary arrangements, should, from our annual reports and at our annual meeting, be branded as inferior factories, whilst there might be scores of other factories which were as great and perhaps worse sinners than they are that would never be published at all, because they have not been inspected. That is one reason why Mr. Millar has not given you the names of these factories and makers. I do not believe the makers are entirely to blame. I believe in most cases the blame is on the directors and the patrons of the factories. I sympathize with the makers not only on account of what they are being paid now, but the difficulty that has been thrown upon them in keeping their factories as they ought to kept. The Board of Directors discussed the idea of having every inspector of this Association made, by virtue of his office, an officer of the Provincial Board of Health, so that he could go to the factory and say, "this factory is not in a proper sanitary condition

and you must put it so." The Board were entirely agreed upon this matter. In Denmark the Government has no hesitation in preventing the exportation of butter not up to a proper standard. You would say that is a very arbitrary proceeding, but they did it in the very interests of the people who might injure themselves. There are a thousand arguments in favor of our inspectors being sanitary officers, and if they were factories would be reported upon and they would have no cause to grumble. (Applause).

The PRESIDENT: I think these inspectors should be Government inspectors, and then every cheese factory would have to look out for itself, and the directors would have to keep the hog pens further away from the factories. I think the inspection should be done by the Government and not by the Association at all.

Mr. JOHN BLAYNEY: I largely fall in with what our late President had to say. While at these meetings the patrons of factories get sometimes a bigger share of the abuse than any other class, and no doubt they need it, at the same time give them fair play. A year ago I drew my own milk and my own whey and my cans were always clean. For the months of September and October I lost $28, not by my own fault but simply because the cheese was not good. If I had to pay 15 cents I would be a big gainer if that 15 cents had saved me $28. This year I have not taken any whey back and I fed no turnips, yet I do not know whether I am going to be saved that loss this year. We have not our returns for the year 1895. I sent enough milk to make 28 cwt. of cheese and I lost one cent a pound by bad management. I sent milk enough in September and October to make 18 cwt. of cheese and I expect I am going to lose $18. Why? Because some of the patrons have fed apples

Mr. TUTTLE: Would it not be well to expend this 15 cents in making them proper cheese-makers so that they would not need so much inspection. Would not it be better to inspect them in the first place and give them a certificate that they were qualified?

The CHAIRMAN: I do not think there is a cheese-maker in this country to-day that would not supply you with first-class cheese if you supplied him with good milk. I think the fault is in the milk they get.

Mr. MONRAD: What do these inspectors do?

The CHAIRMAN: Simply ask them to stop that kind of thing. I know forty factories that lost money by being injured through apples, rye and rape being fed to cattle and by improperly cured cheese, which is sometimes the fault of the maker and sometimes the fault of the factory.

Mr BALLANTYNE: We cannot, in my judgment, attach sufficient importance to a system of inspection and instruction. The gentleman has observed, "Why not teach them in the first place and give them certificates?" Milk is a different article from most articles of manufacture. In most cases you know your raw material. The blacksmith knows about the iron and steel, and the miller his wheat, but milk is a perishable article and is so susceptible of injury from so many causes. When the milk is delivered in the morning it is impossible to help sometimes getting it in an inferior condition. The instructor could stimulate the people very materially; he could assist the maker. The most experienced maker to-day would be greatly benefited by exchanging opinions with one another. They do not sometimes know when they are making the best cheese. Suppose fifteen or twenty factories select the most capable man available—one in whom the other makers have confidence—and let him devote his whole time and attention to it and he would be a better maker than if he were merely making in any one factory, and he should be able to produce from these fifteen factories a higher quality of cheese than if he was making in one factory. The time was when we were getting one and a half to two cents above the average price of the French cheese, and now they are getting prices not far from our best factories. What is the cause of that? It has been just by the same system of organization. The Minister of Agriculture, Mr. Fisher, some years ago discussing this matter in Brockville, said, "I have a scheme by which I propose to organize the whole of Quebec into districts of fifteen or twenty-five factories," and he has been successful in doing that. To him we are indebted for the great movement in Quebec. It was the Western Dairymen's Association that first commenced the system of instruction,

and I think I was the first that suggested it. After talking with some of the members I wrote out a motion, and the late Mr. Losee moved it. We did not think we had a man capable of doing that work, and the result was that Professor Arnold was brought over. Previous to that you could have counted the number of fine factories on your finger ends. I never knew a maker that learned cheese-making at a convention. It is only by practical experience that we are able to learn and apply the principles. We have not followed it up to the same extent. Our grant is being used in what is considered the best interests, but after all we have to go back to the first principles. I do not know where there is a dairy country to day that is not following our example. Do not let it be said the pupil has eclipsed the master. Now, something was said with reference to the curing of cheese. Cheese are not made when they are put upon the shelves, and what percentage of our factories have any means of keeping up an even temperature in the curing room? A stove with a jacket over it, by which they could keep up an even temperature, could be easily procured. I was in a sufficient number of factories this fall to see the radical deficiencies there are in that respect. You must keep up an even temperature to make good cheese. Regarding the complaints that have been made about feed, we all know different kinds of food injure milk. I hope this convention will realize more and more the importance of a thorough system of instruction and inspection. It will amount to very little to each individual, but it will amount to a great deal in the aggregate. If you want to keep the market you must give the highest quality. The days of inferior goods are over. Our market is England. If you give them inferior cheese they won't eat it, and they won't pay the price for it. It has been my privilege for the last two seasons to be in England at the end of the season. When it was getting near the end of the hot weather it was simply amazing the quantity of inferior cheese that were sold at a terrible loss to everybody that had anything to do with them. The practice of taking whey back in the same cans in which the new milk was carried is a very bad practice. I have seen cheese from one hundred different factories, and it was only where that was not done that we found that perfect flavor. That induces people to eat cheese regardless of price. You will only get the poorest class to use cheese that is not palatable and the nicest flavor. To-day, at dinner, in one of the best hotels, I called for a piece of cheese; no person would touch that cheese—no fault, I suppose, of the hotel-keeper; he had no doubt gone to a reliable store, asked for cheese—and the result is that our home trade is nothing at all compared to what it would be if the trade were supplied with a good quality of cheese. I have no doubt this cheese was the cull of some factory. Cheese should have a nice pleasant taste, and taste like a hazel nut. I think we should select our best men and put them out as inspectors, and they would make better cheese in fifteen or twenty factories than they are making in a single factory to-day. I remember many years ago the cheese of a certain factory was so poor that they were unsaleable. The maker telegraphed me to come, and I went, and I told him to go to a certain factory. He went there and stayed a day and I never saw him make a poor cheese afterwards. A very large percentage of our factories are owned by farmers' companies, and not one of them possibly knows anything about it. They hire a maker and they expect him to do everything. Possibly he is a stranger in the neighborhood; if he objects to anything they pay no attention to him. If all the factories were owned by private individuals they would have a sufficient interest in the business to see that everything that could be done was done, and if the maker was not capable of doing all the work they would get someone that could do it. The maker does not live that can detect impurities in milk that will afterwards develop in the manufacturing process. I hope next year we will make a determined effort, a systematic effort, to bring all the factories in the country under some organization. Select the best men that are available—men who have the ability and the knowledge, and in whom the public and cheese-makers have confidence. We are not improving as we have done. We cannot live upon a reputation, we must continue to improve the business, must continue to be what the people expect. They will not pay a premium for our cheese when they can get other cheese equally as good at a less price. We must consider what is the best to be done to improve our reputation and to do all we can to keep it up. (Applause.)

Mr. STEINHOFF: It occurs to me that there is a little misunderstanding as to who is responsible for the quality of cheese. There are some things for which the maker is responsible. When it comes to that question of dirty factories the maker is certainly responsible for that. The maker is not responsible for the condition of the milk. It is not the makers who come to our associations who have the dirty factories. I have met a few, I think—some perhaps that were referred to by Mr. Millar in his report—whose factories are very objectionable. Such makers I do not think we should try to screen. Makers who keep their factories in the best possible condition and who are trying to produce the best quality of cheese, should be protected.

The CHAIRMAN: Mr. Muir, as you all know, is an old cheese-maker. I do not think he requires any introduction; I will let him speak for himself.

## SYNDICATE INSTRUCTOR'S REPORT.

I have much pleasure in presenting my report as syndicate instructor for the season of 1896. I commenced work the 2nd of June by making a hurried visit to all the factories.

Your Secretary, Mr. Wheaton, accompanied me to nearly all of them. We examined the cheese, and I made what suggestions I thought best until I could spend a day with them at the factory. I then started and spent a day at each factory, and I am sorry that I have not a better report to make of the quality and finish of the cheese, and the cleanliness and tidiness of the factories and utensils.

There were seventeen factories in the syndicate, and from my notes of the first visit I beg to report as follows:

Three factories making fine cheese; eight making a harsh, gritty cheese; five making some fine cheese, but the lot uneven, having some weak open-bodied batches; one factory, all the cheese showing too much acid.

The harsh, gritty cheese were caused in almost every case by the rennet not being added to the milk at an early enough stage to allow the curd to have sufficient time in the vat to become well cooked before the development of acid, resulting in the curd having to be dipped from the vat in a soft condition and having to be stirred too much in the sink. In two or three cases the trouble arose from the curd being cut too soon and not being handled with sufficient care on the start. The weak, open-bodied cheese resulted from lack of acid, the makers in some cases not using the hot iron at all, and others calling their spinning on the iron one and a half inches, when I would not call it one inch.

In the one case where the most of the cheese had too much acid the maker was getting very bad milk, the patrons having bulldozed him into taking anything by threatening that if he sent it home they would not send any more to the factory. The first day I spent there, the first vat had a quarter of an inch of acid in an hour after the rennet was added to the milk. This I consider rather swift for the manufacture of fine cheese.

I advised him to call in his board of directors and explain to them that he must have good milk supplied to him if they expected him to make a first-class quality of cheese. He did so, and started the next day and returned every can of milk that was not in good condition, and I am pleased to say that there was a very marked improvement in his cheese on my next visit.

There were only three factories that turned their cheese in the hoops in the morning the first part of the season, and before the close they were all turning them except four. This made a very great improvement in the appearance of the cheese. The great difficulty in the Ingersoll district in getting makers to turn their cheese in the hoops in the morning is, they say, lack of time, on account of the milk coming to the factory so very early in the morning. This no doubt is true, but where a little effort was put forth it was accomplished all right.

I continued making regular visits and had nearly completed the second to all the factories when, on the 11th of July, I met with a very severe accident which laid me up for a month.

I again started out on the 11th of August and continued regular visits until the 5th of November, making in all 147 visits.

There was a steady improvement noted in both the quality and finish of the cheese—all the factories getting more uniform as the season advanced.

I will mention some of the difficulties I had to contend with. I was badly handicapped by not getting to work earlier in the season; then my accident occurring during the warmest weather we had all summer, when it was of the utmost importance that I should have been on duty, interfered greatly with the success of the work and my gaining the confidence of the makers. While they were all anxious for information, still some of them expected their method to be changed as if by magic, and were not ready to accept instruction regarding little details; and it is a well-known fact that no man ever made a success of any business except by close application to every detail. But I am pleased to say in this connection that there was not one maker but acknowledged before the close of the season that if he had followed the instruction given earlier results would have been more satisfactory.

If the work is carried on another year, as I have no doubt it will be, I would recommend the factory owners and makers in each syndicate meeting together before the opening of the season and agreeing as far as possible to use the same kind of furnishings, make their cheese of a certain weight, and do everything possible to make the whole lot uniform in both quality, size and finish, which would result in their not only getting a higher price but would be a lasting benefit to the whole trade.

Let me in conclusion take this opportunity of thanking every man and woman in connection with the syndicate for the uniform courtesy and kindness with which they treated me during my visits with them

JNO. B. MUIR.

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A MEMBER: How is it that it takes more rennet in the fall than in the summer?

Mr. MUIR: Because there is a greater amount of fat in the milk and you can make more cheese.

Mr. MCFARLANE: Do you know whether one cow's milk would take more starter than another?

Mr. MUIR: I have not tried it, but I think different qualities of milk require more or less rennet.

Mr. MCFARLANE: About the curing of the cheese, do you think a stove in the centre of a room gives as much heat around the sides of the room as in the centre?

Mr. MUIR: I think if a stove is in the centre of the room and a proper tin jacket around it the heat will be pretty well distributed around the whole room.

Mr. MCFARLANE: I think the position of the stove should be changed every day.

Mr. MUIR: The cheese on the top shelves will be warmer than the ones on the lower shelves. The new cheese should be always on the top shelves.

Mr. HOARD: I would like to inquire as to whether it has been the practice in the Dominion to put steam pipes around the outside of the curing room and heat the curing room by steam?

The CHAIRMAN: It is done in some cases.

Mr. MURPHY: Nearly all the factories in the east heat their curing rooms in that manner.

Mr. HOARD: Is it a common thing to use steam in the factory?

The CHIARMAN : S eam mostly.

Mr. HOARD : If steam is used in the factory it seems to me it would be a very easy thing for the factory to put two or three pipes around the outside and heat the curing room with steam in that way. With the pipes outside the curing room you have an absolutely uniform temperature all over the room. This I know from my own experience. We buy cheese just as quick as we could get them away from the factory, not daring to trust them in the factory more than eight or ten days. We cured our cheese in this way. We have a cold storage room, and we could hold the temperature just as steadily as we wanted to make it, more or less. There were no cold or no hot spots. The cold air at the bottom was turned out by a ventilator that drove the cold air from the bottom out and the warm air coming down and the warm air going up all the time striking the ceiling, you can always keep your room to a proper temperature. You can hold it so, and it seems to me that ought to be done in all factories.

Mr. MONRAD : Can you keep up steam as easily as you can keep up heat with a base-burner ?

Mr. HOARD : You can bank your fire. For instance, the electric light establishment in our town runs to twelve o'clock at night. Their power is also used in connection with the steam pump for the regulation of water in the case of fire, and they hold eighty pounds of steam in that boiler until the next day at eleven o'clock. If you have a steam regulator between your boiler and your pipe you can keep the steam at eighty in the boiler and at fifteen in the pipe.

Mr. MONRAD : I am afraid not unless you have a large boiler.

Mr. HOARD : I believe you can do a confounded sight better than you are doing.

Mr. J. H. WOOLEY : If I understand Governor Hoard rightly he tells us hot air would drive the cold air out.

Mr. HOARD : Yes, sir ; hot air expands. That is the effect of the hot air. It comes right up through the cold air and expands as you force it into the room through the radiator. In my own house every room has a register for cold air, and the pipe runs from that to the ventilator flue. As the hot air comes into the room the cold air is crowded out by the ventilator flue. If you wish to bring a room quickly to a desired temperature you need some way of taking the cold air out at the bottom. That is the only true way of economic and easy heating of a room to an even temperature.

Mr. WOOLEY : I have my house heated with hot air, and every room has a cold air register, and I have discovered that if I want to heat the room quickly I shut the cold air duct in the other rooms and take the cold air from the room to be heated.

Mr. HOARD : Where all factories have steam it seems to me quite practical to use it, if a little effort is made to replenish the fire at about ten or eleven at night. These steam pipes put around the outside of the room make the room absolutely of an even temperature in the centre ; the heat coming from the outside towards the centre whatever radiation of air there might be is rendered equal.

Mr. R. M. BALLANTYNE : The most serious objection to my mind to Mr. Hoard's idea is that we need the greatest heat after the factories are closed. The majority of our factories close in November, and up to that time we do not require any great amount of heat, but after that time the fire would have to be kept up in the boiler. We have a hot air furnace that was built in Hamilton. It is set in the centre of the room, the top of the hot air furnace is taken off and the sides are carried up about a foot higher than they are ordinarily. The cold air is taken off the floor and goes through the furnace and keeps up a perfect circulation, and as our factory is of brick we do not have much trouble in heating. There is one mistake we made, and that is we bought our furnace from a local dealer. He bought it in Hamilton, brought it to Stratford, and made a galvanized jacket for it. During the past season we bought another furnace for another place from the same dealer. We got it made in Hamilton, jacket and all, and when it arrived in Stratford we found it had a double jacket, one on the inside of corrugated iron and then

asbestos, and then another jacket, so that you could put your hand on the outside of the furnace and not feel any heat. We found we could keep the room at an even temperature. The furnace was large enough so that we had no difficulty in controlling it. The serious difficulty in Mr. Hoard's method is that the boiler would be required to be kept going in the coldest period, and after the factory had closed.

The CHAIRMAN: Most of the boilers are small and I do not think they would keep up sufficient steam.

A MEMBER: What was the cost of that furnace?

Mr. BALLANTYNE: The first cost $35 and the second $32 and freight, so that they practically both cost the same.

## FRATERNAL GREETINGS FROM THE EAST.

BY R. G. MURPHY, SECRETARY EASTERN DAIRYMEN'S ASSOCIATION.

I am not here for the purpose of making a speech. I have the honor of being secretary of the Eastern Dairymen's Association. I am a farmer, milking cows like the rest of the men who are here. I am anxious to attend all these associations that it is possible for me to reach. I gathered a great deal of information and put such into practical use as is applicable to my particular situation. I hope every farmer here present will take home with him some knowledge and put it into practice. I must say that I have already received considerable information by listening to the papers that have been read by your Secretary and by your inspectors, as well as your President. If you had nothing further than this to take home with you, and if you digested these things and put them into practice you would do yourselves a great amount of good.

I was sent here for the express purpose of bringing fraternal greetings from the Eastern Dairymen's Association to the Western Dairymen's Association. There has not been as much intimacy or as much friendly feeling existing between these two associations as we in the east think should exist, and, as you know, there has already taken place a form of amalgamation the details of which have to be worked out. I am here in the interests of the Eastern Association to assist you in working out these details so far as my ability lies.

In regard to the heating of factories, we heat ours by steam, but a little different from the way Mr. Hoard speaks of. We have two factories heated in that way. The steam is regulated by a valve inside the factory, so that we let in just the quantity of steam required. We have a pipe going below the shelves and one between them. Every pair of shelves has a pipe. As was mentioned by Mr. Ballantyne, it is necessary to have a good sized boiler. We have no difficulty whatever; our cheese-maker attends to the fire the last thing before going to bed and the room is kept at a proper temperature. I just want to say one word in regard to some of the suggestions that were thrown out here about paying fifteen cents per patron to employ inspectors. We have had six during the last season, five of them on the road continually. We get the same Government money that you do, but that money is supplemented by our people. They have added $1,800 to the amount. We have adopted a principle that the factory that contributes $5 will get one visit, those which pay $10 get three visits, and any visits over that are paid for in proportion. Our inspectors had more factories than they could attend to last year, and we will have to place more inspectors on the road. Who pays this $5? We manage our factories in the east somewhat different to the way you do here, because all our factories are owned by private individuals. We tried the joint stock system there and it did not work as satisfactorily as it does with you. The patrons generally pay this amount and are very glad to have an inspector come, and the amount is taken out of the money before the dividend is paid in the fall.

Now, this is a very small amount when taken out of the entire dividend, and the factories which contribute get the benefit of the inspectors. You could not get our people to go out of this way of doing things. Instead of diminishing it is increasing. I thank you Mr. Chairman and gentlemen for your kindly hearing. (Applause.)

Mr. HOARD: I would like Mr. Murphy to say how his curing room is built.

Mr. MURPHY: It is a frame structure placed upon a stone foundation. At the bottom next to the floor we draw in cold air. The room is lined and filled in with sawdust, and places left for ventilation next to the floor. We have two air spaces in our curing room, and we have no difficulty whatever in heating our room and keeping it at a proper temperature.

## REPORT OF DAIRY EXHIBITS AT THE INDUSTRIAL AND WESTERN FAIRS AND PROVINCIAL FAT STOCK AND DAIRY SHOW.

I have pleasure in presenting my second annual report as your representative to the Industrial Fair. I was present at the annual meeting of the Fair Association on February 18th, and a meeting of the dairy committee on May 2nd, when the prize list was revised and judges recommended.

There was no change made in the prize list last year, the prizes in the various sections being the same as in the year previous. A special gold medal valued at not less than $50 was given by the Windsor Salt Co., Windsor, Ont., for the best lot of cheese on exhibition in the factory classes. At the request of the donors this medal was awarded under the special supervision of the Western Dairymen's Association. The judge last year was the same as the year previous, in the person of your worthy President, Mr. A. F. McLaren, M.P. In justice to Mr. McLaren, I might state that early in the season, owing to the pressure of other work, he declined to act as judge at any of the fairs; but as a special request was made by the Eastern Dairymen that he be again appointed, he was induced to consent, and in an impartial and careful manner the prizes were awarded with satisfaction to all parties concerned.

At the request of the manager of the fair I again assisted in judging by way of keeping a record of the score made by each exhibit, and after the awards were made filled in the score cards, which were afterwards sent to the various exhibitors. The score card used was arranged according to the following standard for points of quality: Flavor, 35; quality, 25; texture, 15; color, 15; finish, 10; total, 100.

In point of number the cheese exhibt was not as large as in 1895, though the exhibits covered a wider area. There were 375 factory cheese on exhibition, besides some truckles and stiltons; the former made up of lots from the various Provinces as follows: Ontario, 321; Quebec, 25; Manitoba, 22; and Prince Edward Island, 7; making what might be called a Dominion exhibit. All the prizes came to Ontario makers, excepting one which went to Prince Edward Island. The gold medal given by the Windsor Salt Co. was awarded to John Morrison, Newry, Ont.

The average quality was better than the previous year, there not being such a wide range between the quality of the poorest and the best. The highest score made was 96, and the lowest 84. Flavor was the weakest point, there being only one or two exhibits that might be said to have anything like a perfect flavor. There was a decided improvement in the finish of the cheese, which is an encouraging feature, as it shows more careful workmanship on the part of the makers. The cheese from Quebec were on the whole, not so fine as those shown from that Province in 1895. This year they were not so well made, though there was an improvement in flavor. The cheese from Manitoba showed a marked improvement over the exhibit of the previous year from that Province. The report of the judge last year was that the cheese from that Province was only suited for the local trade. This year's exhibit showed that some of the makers of the Prairie Province are capable of making a good shipping cheese. The cheese from Prince Edward Island, though very commendable in many respects, were lacking in that essential quality, a fine flavor. It was, however, the only Province outside of Ontario that secured a prize, which is something to boast of.

The butter exhibit was under the immediate charge of Mark Sprague, instructor for the Ontario Creameries' Association, and therefore I am unable to give many details

concerning it that I otherwise would had I given more attention to that department. The exhibit of creamery butter was about three times larger than the previous year, there being about enough creamery butter alone to fill the refrigerator space provided. The judge, Mr. McGillis, of Montreal, made special note of the improvement in quality over former years. The highest score for creamery butter was 98 points, and the lowest 87½. The chief faults were, having too much salt and being too highly colored. The display of dairy butter was about the same in quantity as the year previous, with the quality about the same also. The highest score was 97 and the lowest 94½. Flavour was the chief point in which it was lacking.

The prize-winners in the cheese and butter classes are given as follows:

CHEESE AWARDS.

Best 4 cheese (colored), June and July make.—1, T. B. Sellars, Laurel; 2, W. W. Harris, Rothsay; 3, W. A. Bell, Dunkeld; 4, Jas. A. Gray, Atwood; 5, J. F. Millar, Brantford; 6, Wm. Stacey, Summerhill.

Best 4 cheese (white), June and July make.—1, Mrs. Drewry, Godolphin; 2, John Morrison, Newry; 3, Jas. A. Gray; 4, M. Morrison, Harriston; 5, Alex. Anderson, Ashdown; 6, S. T. Wallace, P. E. I.

Best 3 cheese (colored), August make.—1, John Morrison; 2, J. F. Millar; 3, W. W. Harris; 4, James T. Morrison, Orono; 5, John Connolly, Malcolm; 6, Thos. H. Cornett, Shelburne.

Best 3 cheese (white), August make —1, John Morrison; 2, Frank Boyes, Nilestown; 3, T. B. Sellars; 4, Jas. A. Gray; 5, Mrs. Drewry; 6, James McKillar, Armow.

Best 6 Stilton.—1, A. R. Curzon, Guelph.

Best 3 Truckle.—1, W. F. Gerow, Napanee; 2, John Morrison; 3, Samuel Flack, Lavender; 4, J. T. Hill, Napanee.

BUTTER AWARDS.

Best 3 firkins creamery butter.—1, 3, 4 and 5, Croil & McCullough, Montreal; 2, I. Wenger, Ayton; 6, Struthers & McQuaker, Owen Sound.

Best 75 lbs. creamery butter in print.—1, 2 and 3, Croil & McCullough; 4, D. Stouffer, Stouffville 5, Struthers & McQuaker; 6, I. Wenger.

Best 60 lbs. in packages not more than 10 lbs. each.—1, I. Wenger; 2, Croil & McCullough; 3, W. F. Gerow, Napanee; 4, James Ireland, Beachville; 5, Millar & Ferguson, Spencerville.

Best 3 firkins farm dairy butter, not less than 30 lbs. each.—1, A. Orchard, Seagrain; 2, Mrs. Marion Burke, Bowmanville; 3, Wm. Elliott, Galt; 4, H. Berry, Elmwood; 5, S. Hunter, Rockton; 6, Jas. A. Watson, Eden Mills.

Best 2 firkins farm dairy, not less than 20 lbs. each.—Jas. A. Watson; 2, Mrs. M. Burke; 3, A. Orchard; 4, S. Hunter; 5, J. G. Snell, Snellgrove; 6, Mrs. Jno. McCarl, Lakeport.

Best basket pound prints.—1, Mrs. M. Burke; 2, S. Hunter; 3, Mrs. A. Mason, L'Amaroux; 4, Mrs. John McCarl; 5, Mrs. J. Burgess, Baltimore; 6, Wm. Elliott.

It would not do to close this part of the report without referring to the accommodation provided for dairy products. Until last year a special building was provided for dairy products at the Industrial near the main entrance, where it was seen by nearly everyone visiting the Fair. Last year the dairy display was located under the grandstand and though roomy enough, could have been fitted up in much better shape for this important exhibit. In some respects the room was better suited for dairy products than the old one. The temperature was lower and the cheese and butter did not suffer from the heat The light, however, was bad. This could have been remedied to a great extent by making more windows and enlarging those already there. The whole affair seemed to be a kind of "make shift," improvised at the last moment when the old building was required for some other exhibit, without consulting the wishes of the dairymen. The worst feature was the location, which was such as prevented many who desired to see the exhibit from doing so, and the numbers who visited the dairy building were nothing like what they were other years. Your representative did not fail to apprise the Fair authorities of how the dairy interests had been side-tracked, and we have the promise of the President and manager that either a new building or better quarters will be provided next year. This will likely be fulfilled, as it is the intention of the Fair Board to hold a Dominion Exhibition next year, when an agricultural hall is likely to be erected with special provision for dairy products.

## THE WESTERN FAIR.

Your representatives to the Western Fair last year were Robert Robertson, Canada, and John Gilmour, Nilestown, who attended the annual meeting of the Fair Association, and the meeting of the dairy committee when the prize list was revised and judges recommended. However, as I have assisted the judges in keeping a record of the score made in the cheese and butter classes, I am perhaps in a better position to give a detailed report.

The judges last year were Mr. R. M. Ballantyne, one of our directors, in cheese, and Mr. W. P. Hibbard in butter. These gentlemen performed their duties in a careful and impartial manner, and with satisfaction to all concerned.

There were 219 cheese on exhibition, which was somewhat less than in 1895. The cheese presented many of the same characteristics that the cheese at Toronto did. A great many of them were lacking in flavor. The general appearance of the exhibit was good, though several exhibitors have yet considerable to learn in the matter of finishing a cheese. In scoring, quite a few points were deducted because cheese had the corners broken, the bandages pulled down, or presented an unsightly appearance. A maker is not always responsible for the flavor of a cheese, but he should be responsible for every other part of the make up. The June and July cheese exhibited were more lacking in flavor than the August cheese, which were much better, with the white cheese showing an improvement over the colored. The score card provided was divided as follows: Flavor, 40; texture, 25; body, 15; color, 10; make up, 10; total, 100. In judging the cheese it was thought better to combine texture and body and the accompanying record of the scores made by each exhibit was based upon it.

A gold medal was also given at the Western Fair by the Windsor Salt Company for the best lot of cheese on exhibition and the award was made under the direction of this Association. The Fullarton cheese factory, Fullarton, Ont., won the gold medal; full points for flavor being given for the cheese from that factory. Your President presented the medal to Mr. Stacey, the maker, and also the one awarded at Toronto to Mr. Morrison with an appropriate letter in each case.

The butter exhibit was more than twice as large as the previous years. The creamery butter was fine in quality and showed a decided improvement over last year's (1895) exhibit. Nearly all the leading creameries in the west were represented. The dairy butter presented a great variety of qualities and packages. A large portion of it was too highly colored, and many exhibits were lacking in flavor. One of the objectionable features in exhibits of dairy butter is the number and variety of ways in which it was placed on exhibition. It would be well for the Fair authorities to have some uniform package specified in the prize list, as it would greatly add to the appearance of the whole exhibit. The butter was scored according to the following scale: Flavor, 45; grain, 25; color, 15; salting, 10; packing, 5; total, 100.

A new building was provided for the dairy exhibit last year and was devoted exclusively to dairy products and dairy supplies The location was an improvement over the old place and was near the main agricultural hall. The arrangements for cheese were adequate and of such a character as to show off the cheese to the best advantage. A new refrigerator was provided for the butter exhibit, and though considered too large when first planned proved hardly sufficient for the largely increased exhibit of butter. The shelving within was so arranged as to show off the exhibit to good advantage.

The dairy department at the Western Fair is under the immediate charge of Mr. J. S. Pearce, your first Vice-President, who is energetic and careful in looking after the interests of the dairy exhibit.

The following is a tabulated record of the score made by each exhibit, with the awards in each case. In the June, July and August cheese sections only the average score is given :

CHEESE.

Section 1.—Best 3 August (colored).

| Exhibitor. | Address. | Flavor. 40 | Texture and body. 40 | Color. 10 | Make up. 10 | Total. 100 | Prize awarded. |
|---|---|---|---|---|---|---|---|
| Geo A. Boyes | Evelyn | 38 | 38 | 10 | 9 | 95 | Second prize |
| Rich. Chowan | Thamesford | 38 | 39 | 9 | 10 | 96 | First " |
| Wm. Stacey | Summerhill | 38 | 38 | 9 | 9 | 94 | Third " |
| John Brodie | Mapleton | 37 | 38 | 9 | 9 | 93 | Fourth " |
| Frank Boyes | Nilestown | 36 | 38 | 9½ | 9 | 92½ | Fifth " |
| C. A. Clarke | Warwick | 35 | 37 | 9 | 9 | 90 | |
| Jas. A. Gray | Atwood | 35 | 39 | 9 | 9 | 92 | |
| Wm. McIlvride | Stayner | 32 | 36 | 3 | 9 | 80 | |
| B. J. Connolly | Kintore | 36 | 35 | 10 | 9 | 90 | |
| S. A. Smith | Dorchester | 35 | 36 | 9 | 7 | 87 | |
| W. J. Atkinson | Medina | 35 | 32 | 10 | 9 | 86 | |
| Duncan Sinclair | Cotswold | 35 | 37 | 8 | 9 | 89 | |
| M. Morrison | Harriston | 38 | 37 | 6 | 9 | 90 | |
| J. A. McCabe | Lynden | 38 | 38 | 5 | 6 | 87 | |
| James Ireland | Beachville | 35 | 37 | 3 | 9 | 84 | |
| T. C. Mallory | Yarmouth Centre | 30 | 38 | 8 | 5 | 85 | |
| Jno. Morrison | Newry | 38 | 36 | 9 | 9 | 92 | |
| J. S. Isard | Paisley | 38 | 32 | 9 | 9 | 88 | |
| Jno. Connolly | Malcolm | 37 | 36 | 6 | 9 | 88 | |
| Frank Rice | Sweaborg | 32 | 38 | 6 | 9 | 85 | |
| W. W. Harris | Rothsay | 38 | 36 | 5 | 9 | 88 | |
| T. B. Sellars | Laurel | 35 | 36 | 5 | 9 | 85 | |

Section 2.—Best 3 August (white).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Wm. Stacey | Summerhill | 37½ | 38 | 9 | 9 | 93½ | Fifth prize. |
| Newton Cosh | Woodstock | 38 | 38 | 9 | 9 | 94 | Fourth " |
| Wesley White | Hawkesville | 38 | 38 | 9½ | 9 | 94½ | Third " |
| Frank Boyes | Nilestown | 39 | 39 | 9½ | 9 | 96½ | Second " |
| Thos. Stacey | Fullarton | 40 | 38 | 10 | 10 | 98 | First " |
| Jas. E. Holmes | Carthage | 39 | 37 | 9 | 8 | 93 | |
| B. J. Connolly | Kintore | 38 | 37 | 9 | 9 | 93 | |
| Geo. A. Boyes | Evelyn | 35 | 37 | 10 | 10 | 92 | |
| M. Morrison | Harriston | 37 | 39 | 8 | 9 | 93 | |
| D. McMillan | Poole | 36 | 38 | 9 | 9 | 92 | |
| Jno. Morrison | Newry | 36 | 39 | 9 | 9 | 93 | |
| Jno Connolly | Malcolm | 38 | 36 | 9 | 9 | 92 | |
| T. B. Sellars | Laurel | 36 | 36 | 8 | 8 | 88 | |
| Jas. A. Gray | Atwood | 32 | 36 | 8 | 9 | 85 | |
| Alex. Anderson | Arva | 38 | 37 | 9 | 4 | 88 | |
| Frank Millson | Winthrop | 30 | 33 | 8 | 9 | 80 | |
| Duncan Sinclair | Cotswold | 38 | 36 | 8 | 8 | 90 | |
| J. L. Thompson | Belfast | 30 | 32 | 6 | 10 | 78 | |
| J. S. Clarke | Warwick | 38 | 36 | 9 | 9 | 92 | |

Section 3.—Best 6 (colored), June, July and August.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| T. B. Sellars | Laurel | 35½ | 37½ | 8½ | 8½ | 90 | First prize. |
| Frank Boyes | Nilestown | 37 | 35 | 8½ | 9 | 89½ | Second " |
| W. J. Atkinson | Medina | 33½ | 35 | 9 | 7 | 84½ | Third " |
| Rich. Chowan | Thamesford | 30½ | 35½ | 9 | 8½ | 83½ | Fourth " |
| M. Morrison | Harriston | 33½ | 32 | 5½ | 8½ | 79½ | Fifth " |

CHEESE.—*Continued.*

Section 4.—Best 6 (white), June, July and August.

| Exhibitor. | Address. | Flavor. 40 | Texture and body. 40 | Color. 10 | Make up. 10 | Total. 100 | Prize awarded. |
|---|---|---|---|---|---|---|---|
| John Morrison | Newry | 37 | 36½ | 8 | 9 | 90½ | First prize. |
| M. Morrison | Harriston | 36 | 36½ | 7½ | 9 | 89 | Second " |
| B. J. Connolly | Kintore | 35 | 36 | 9 | 8½ | 88½ | Third " |
| Jas. A. Gray | Atwood | 35½ | 36½ | 8½ | 7 | 87½ | Fourth " |

Section 5.—Best 3 (white), July.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| M. Morrison | Harriston | 38 | 38 | 8 | 9½ | 93½ | First prize. |
| Frank Boyes | Nilestown | 38 | 37 | 9 | 9 | 93 | Second " |
| B. J. Connolly | Kintore | 36 | 38 | 9 | 9 | 92 | Third " |
| Jno. Morrison | Newry | 35 | 38 | 9 | 9 | 91 | Fourth " |
| Frank Millson | Winthrop | 37 | 35 | 8 | 9 | 89 | |

Section 6.—Best 3 (colored) July.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| James A. Gray | Atwood | 38 | 37 | 9 | 9 | 93 | First prize. |
| B. J. Connolly | Kintore | 35 | 39 | 9 | 9 | 92 | Second " |
| Jno. Morrison | Newry | 35 | 38 | 9 | 9 | 91 | Third " |
| W. J. Atkinson | Medina | 36 | 36 | 9 | 8 | 89 | Fourth " |
| W. W. Harris | Rothsay | 37 | 35 | 5 | 8 | 85 | |
| M. Morrison | Harriston | 37 | 36 | 6 | 9 | 88 | |
| Geo. A. Boyes | Evelyn | 30 | 37 | 9 | 7 | 83 | |
| Thos. Stacey | Fullarton | Awarded gold medal given by the Windsor Salt Co. for the best cheese on exhibition. | | | | | |
| Frank A. Boyes | Nilestown | Awarded silver medal for the second best cheese on exhibition. | | | | | |

BUTTER.

Section 1.—Creamery package not less than 50 lb.

| Exhibitor. | Address. | Flavor. 45 | Grain. 25 | Color. 15 | Salting. 10 | Packing. 5 | Total. 100 | Prizes awarded. |
|---|---|---|---|---|---|---|---|---|
| Wm. Waddell | Komoka | 42 | 23 | 14 | 10 | 4 | 93 | First. |
| Isaac Wenger | Ayton | 43 | 23 | 12 | 8 *h* | 4 | 90 | Second. |
| Gidley & Bird | Lafontaine | 43 | 23 | 12 | 8 *h* | 3 | 89 | Third. |
| Fisher & Bearman | Desboro' | 43 | 23 | 8 *m* | 10 | 4 | 88 | Fourth. |
| James Ireland | Beachville | 41 | 20 | 13 | 8 *h* | 5 | 87 | |
| Halliday & Co | Chesley | 42 | 21 | 8 *l* | 10 | 4 | 85 | |
| J. C. Bell | Winchelsea | 41 | 22 | 10 | 5 *h* | 2 | 80 | |
| Aaron Wenger | Fergus | 43 | 22 | 5 *m* | 10 | 4 | 84 | |
| Bothwell Dairy Co | Bothwell | 40 | 10 | 8 | 10 | 5 | 73 | |

BUTTER.—*Continued.*

Section 2.—Creamery, 50 lb., in prints or rolls.

| Exhibitor. | Address. | Flavor. 45 | Grain. 25 | Color. 15 | Salting. 10 | Packing. 5 | Total. 100 | Prizes awarded. |
|---|---|---|---|---|---|---|---|---|
| Halliday & Co | Chesley | 43 | 24 | 14 | 10 | 5 | 96 | First. |
| James Ireland | Beachville | 43 | 23 | 14 | 10 | 5 | 95 | Second. |
| Jno. C. Taylor | Bothwell | 43 | 23 | 14 | 9 | 5 | 94 | Third. |
| Isaac Wenger | Ayton | 40 | 23 | 10 *l* | 9 | 5 | 87 | |
| Fisher & Bearman | Desboro' | 42 | 22 | 14 | 9 | 5 | 92 | |
| P. McEwan | Wroxeter | 40 | 22 | 13 *l* | 8 | 5 | 88 | |
| A. Wenger | Ayton | 42 | 22 | 12 *m* | 9 | 5 | 90 | |
| J. C. Bell | Winchelsea | 42 | 22 | 14 | 8 | 5 | 91 | |
| Bothwell Dairy Co | Bothwell | 40 | 22 | 10 *l* | 9 | 5 | 86 | |
| Wm. Waddell | Komoka | 42 | 23 | 14 | 9 | 5 | 93 | |

Section 3.—Private Dairy packages.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mrs. M. Burke | Powmanville | 42 | 23 | 14 | 9 | 5 | 93 | First. |
| T. W. Crealy | Strathroy | 43 | 23 | 14 | 9 | 3 | 92 | Second. |
| Carl Holm | Ayton | 42 | 22 | 14 | 9 | 4 | 91 | Third. |
| Mrs. Geo. Hunt | Dorchester | 40 | 22 | 14 | 9 | 2 | 87 | |
| Jno. McPherson | Campbelltown | 41 | 22 | 10 | 8 | 4 | 85 | |
| J. G. Mair | Howick, Que | 41 | 22 | 13 | 9 | 4 | 89 | |
| Wm. Taylor | Tempo | 42 | 23 | 10 | 9 | 5 | 89 | |
| Saml. Hunter | Rockton | 42 | 22 | 12 | 8 | 4 | 88 | |
| Robt. Morgan | Kerwood | 41 | 15 | 13 | 5 | 2 | 76 | |
| W. C. Shearer | Bright | 39 | 20 | 12 | 9 | 5 | 85 | |
| J. C. Nicholl | Newbury | 25 | 20 | 13 | 9 | 3 | 70 | |
| Mrs. A. Begg | Westminster | 30 | 10 | 8 | 8 | 4 | 60 | |
| Mrs. Isaac McLurg | Ivan | 40 | 22 | 9 | 9 | 4 | 84 | |

Section 4.—Private Dairy in prints.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| T. W. Crealy | Strathroy | 42 | 23 | 14 | 10 | 5 | 94 | First. |
| Mrs. Geo. Hunt | Dorchester | 40 | 23 | 14 | 9 | 5 | 91 | Second. |
| Mrs. Alex. Begg | Westminster | 41 | 23 | 12 | 9 | 5 | 90 | Third. |
| Mrs. Jno. Sinclair | Poplar Hill | 39 | 20 | 8 | 8 | 4 | 79 | |
| Mrs. E. Lawrence | London West | 40 | 22 | 12 | 9 | 5 | 88 | |
| Mrs. Chas. Trebilcock | The Grove | 40 | 22 | 12 | 9 | 5 | 88 | |
| C. H. Sumner | Forden | 30 | 8 | 5 | 8 | 2 | 53 | |
| Saml. Hunter | Rockton | 40 | 20 | 11 | 8 | 4 | 83 | |
| Carl Holm | Ayton | 40 | 21 | 10 | 9 | 4 | 84 | |
| W. C. Shearer | Bright | 30 | 22 | 13 | 9 | 5 | 79 | |
| Mrs. E. McLurg | Ivan | 35 | 20 | 12 | 9 | 5 | 81 | |
| Jno. McPherson | Campbelltown | 25 | 15 | 12 | 8 | 4 | 64 | |
| P. McEwan | Wroxeter | 40 | 20 | 10 | 9 | 5 | 84 | |
| J. G. Mair | Howick, Que | 40 | 20 | 10 | 8 | 4 | 82 | |
| Mrs. M. Burke | Bowmanville | 40 | 22 | 12 | 9 | 4 | 87 | |

Section 5.—Best 10 lb. dairy square print.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| W. C. Shearer | Bright | 41 | 23 | 14 | 9 | 5 | 92 | First. |
| Jno. McPherson | Campbelltown | 40 | 22 | 14 | 9 | 5 | 90 | Second. |
| T. W. Crealy | Strathroy | 40 | 23 | 10 | 9 | 4 | 86 | |
| Mrs. Jno. Sinclair | Poplar Hill | 35 | 15 | 10 | 9 | 3 | 72 | |
| Wm. Waddell | Komoka | 40 | 22 | 14 | 9 | 4 | 89 | |
| P. McEwan | Wroxeter | 41 | 21 | 13 | 9 | 5 | 89 | |
| Carl Holm | Ayton | 40 | 22 | 12 | 9 | 5 | 88 | |

BUTTER.—*Continued.*

Section 6.—Farm dairy rolls or prints.

| Exhibitor. | Address. | Flavor. 45 | Grain. 25 | Color. 15 | Salting. 10 | Packing. 5 | Total. 100 | Prizes awarded. |
|---|---|---|---|---|---|---|---|---|
| Mrs. E. Burke | Bowmanville | 43 | 23 | 14 | 9 | 5 | 94 | First. |
| Mrs. W. C. Shearer | Bright | 42 | 23 | 14 | 9 | 5 | 93 | Second. |
| Mrs. E. Lawrence | London West | 40 | 23 | 14 | 8 | 4 | 89 | Third. |
| Mrs. G. Hunt | Dorchester | 40 | 22 | 13 | 8 | 5 | 88 | Fourth. |
| T. W. Crealy | Strathroy | 40 | 23 | 10 | 9 | 4 | 86 | |
| P. McEwan | Wroxeter | 39 | 20 | 13 | 8 | 4 | 84 | |
| Jno. McPherson | Campbelltown | 40 | 20 | 10 | 8 | 4 | 82 | |
| Geo. Murray | Wilton Grove | 35 | 15 | 10 | 7 | 4 | 71 | |
| Jno. Doyle | Lambeth | 35 | 20 | 10 | 8 | 4 | 77 | |
| Mrs. E. McLurg | Ivan | 35 | 22 | 13 | 8 | 4 | 82 | |
| Mrs. Chas. Trebilcock | The Grove | 40 | 22 | 10 | 8 | 5 | 85 | |
| G. W. Riddell | Wilton Grove | 40 | 22 | 8 | 8 | 4 | 82 | |
| Mrs. M. Shaver | Wilton Grove | 38 | 20 | 14 | 8 | 4 | 84 | |
| R. Palmer | Thorndale | 35 | 18 | 12 | 8 | 3 | 76 | |
| J. G. Mair | Howick, Que. | 38 | 23 | 12 | 8 | 4 | 85 | |
| Mrs. J. C. Nicholl | Newbury | 35 | 15 | 10 | 8 | 4 | 72 | |
| Jno. Sinclair | Poplar Hill | 39 | 20 | 10 | 8 | 4 | 81 | |
| Saml. Hunter | Rockton | 40 | 22 | 12 | 8 | 5 | 87 | |
| Carl Holm | Ayton | 40 | 22 | 12 | 8 | 5 | 87 | |
| Mrs. A. Begg | Westminster | 40 | 23 | 10 | 9 | 5 | 87 | |

## DAIRY TEST AT GUELPH.

The second annual dairy competition in connection with the Provincial Fat Stock and Dairy Show took place at Guelph on December 8th and 9th. This department was inaugurated in a small way in 1895. Last year the regular prize list was increased to $500, made up of grants of $50 each from the Dairymen's Association of Eastern Ontario and your own Association, and the balance from the Dominion Cattle Breeders' Association. This amount was supplemented by a number of special prizes from the American and Canadian Holstein Friesian Associations, the Wilkinson Plow Co., Toronto, and Thom's Implement Works, Watford, Ont.

The dairy department of the show was under the special direction of the Dairy Committee, consisting of the President and Secretary of the Eastern and Western Dairymen's Associations, and Professor Dean, of the Ontario Agricultural College. In the prize list separate classes were provided for each of the various dairy breeds and an additional one for grades, with separate sections in each class for cows over thirty-six months and for those under thirty-six months.

The number of cows competing last year was about double that of the year previous. There were twenty cows in all, made up of five Jerseys, four Ayrshires, 5 Holsteins and six grades. A forty-eight hour milking test was conducted according to the standard rules of the British Dairy Farmers' Association, with the addition of twenty points for constitution and conformation, and which are as follows: one point for each pound of milk; twenty points for each pound of fat; four points for each pound of solids (not fat); one point for each ten days in milk, after the first twenty days (limit 200 days); ten points shall be deducted from the total score for each per cent. of fat below three per cent. of fat in the milk. The rations fed to competing cows were not taken into account.

The results of the test are tabulated on the next page.

## RESULTS OF DAIRY TEST AT GUELPH FAT STOCK SHOW.

| Breed. | Name of cow. | Owner. | Points for conformation. | Total pounds of milk. | Average per cent. of fat. | Total pounds of fat. | Average p. c. of solids not fat. | Total pounds of solids not fat. | Total points scored. | Awards. |
|---|---|---|---|---|---|---|---|---|---|---|
| Jerseys, over 36 months | Elen of Oakdale | J. H. Smith & Son, Highfield. | 16.25 | 59.00 | 5.47 | 3.155 | 9.77 | 5.696 | 181.13 | First. |
| " " | Corinne of Don | B. H. Bull & Son, Brampton.. | 17.75 | 55.00 | 4.72 | 2.581 | 9.51 | 5.307 | 146.59 | Second. |
| " " | Signal Rosea May | J. H. Smith & Son | 18.75 | 44.25 | 5.96 | 2.591 | 9.88 | 4.399 | 142.92 | Third. |
| " under 36 months | Ida of Highfield | " | 16.25 | 52.75 | 3.90 | 3.042 | 9.11 | 4.810 | 153.08 | First. |
| " " | Queen of Highfield | " | 18.00 | 36.75 | 5.30 | 1.956 | 9.55 | 3.522 | 137.95 | Second. |
| Ayrshires, over 36 months | Dandy | Naaman Dyment, Clappison .. | 16.75 | 83.75 | 3.44 | 2.886 | 9.08 | 7.655 | 194.34 | First. |
| " " | Pauline Hall | W. M. & J. C. Smith, Fairfield Plains. | 18.50 | 62.25 | 3.93 | 2.555 | 9.36 | 5.871 | 159.85 | Second. |
| " " | Gurta (19) | W. M. & J. C. Smith | 18.50 | 54.75 | 4.25 | 2.380 | 9.52 | 5.187 | 149.09 | Third. |
| " under 36 months | Rose Morton | W. Thompson, Rockton | 17.00 | 52.25 | 3.96 | 2.086 | 9.50 | 4.988 | 138.92 | First. |
| Holsteins, over 36 months | Calamity Jane | A. & G. Rice, Currie's | 17.25 | 134.50 | 2.96 | 3.903 | 8.88 | 11.990 | 279.28 | First. |
| " " | Edgely Frena (43 mos. old) | A. Hoover, Emery | 15.25 | 104.37 | 3.38 | 3.519 | 8.78 | 9.218 | 232.87 | Second. |
| " " | Catholine | A. & G. Rice | 16.25 | 90.50 | 2.86 | 2.588 | 8.92 | 8.079 | 196.82 | Third. |
| " under 36 months | Iolena of Fairmont | " | 15.75 | 75.25 | 3.20 | 2.391 | 9.21 | 6.964 | 171.17 | First. |
| " " | Bright Promise | " | 14.00 | 50.00 | 3.23 | 1.623 | 8.52 | 4.264 | 122.51 | Second. |
| Grade cows, over 36 months | Holstein | " | 15.50 | 97.75 | 3.76 | 3.741 | 8.99 | 8.852 | 230.47 | First. |
| " " | Durham | J. R. Grieve, Guelph | 14.50 | 93.25 | 3.50 | 3.218 | 8.81 | 8.202 | 205.91 | Second. |
| " " | Durham | T. H. Dent, Woodstock | 15.00 | 85.00 | 3.53 | 2.945 | 9.05 | 7.686 | 196.14 | Third. |
| " " | Jersey | Jas. Hurley, Guelph | 17.00 | 80.50 | 3.47 | 2.812 | 8.47 | 6.844 | 181.11 | Highly commended. |
| " " | Guernsey | Mr. Tyson, Guelph | 16.50 | 58.25 | 5.00 | 2.955 | 9.74 | 5.686 | 169.09 | Commended. |
| " under 36 months | Jersey | Jas. Hurley | 16.00 | 23.00 | 5.60 | 1.297 | 9.96 | 2.299 | 94.63 | First. |

The sweepstake prizes were all won by Holstein cows, Calamity Jane standing first as the best dairy cow of any age, breed or class, with Edgely Frena second. Calamity Jane also won the two first prizes given by the American and Canadian Holstein Friesian Associations, Edgely Frena the two seconds, and Catholine the third.

Considering the time of the year in which the show was held, and the expense and risk attached to bringing milch cows any distance to compete in a milking test, the dairy department was in every way a success, and justifies the expenditure connected with it. After a year or two, when the dairy department becomes more widely known and dairy breeders have adapted themselves to the new conditions incident to a December test, we may look for a much larger number of entries and more effective results. It would be more satisfactory in a test of this kind if the feed consumed during the test were taken into account; but this is almost impracticable in a two days' test. The accommodation provided for the dairy exhibit was good, and exhibitors speak very highly of the attention given them by the management of the show.

The judges in the dairy department were R. G. Murphy, Secretary of the Eastern Ontario Dairymen's Association; Mr. G. E. Day, of the Ontario Agricultural College, who took Professor Dean's place in his absence, and your Secretary. Valuable assistance was rendered by your inspector, Mr. Millar, and Mr. H. Hutton, of the O. A. C., who looked after testing the milk.

All of which is respectfully submitted.

Your obedient servant,

J. W. WHEATON

## ADDRESS OF WELCOME.

Mayor ELLIOTT, in a short speech, cordially welcomed the convention to Brantford, and said: I believe this Association is convened for the purpose of discussing matters pertaining to dairy interests. If the discussions that take place here should be the means of increasing the production of butter to one pound extra on each farm, or of increasing the production of milk to one gallon extra upon every farm, or be the means of placing an extra pound of beef upon every beef animal in Canada, I think your deliberations would be of great benefit to the country at large. When you are through with your convention, and after you have seen the many attractive things to be seen in Brantford, we hope you will go away satisfied and pleased, and that you will return on some future occasion.

Mr. A. PATTULLO, M.P.P., replied on behalf of the Association, and paid a high tribute to Brantford as a centre of manufacturing and other enterprises. He added: There is one connection in reference to agriculturists in which your fame went abroad years ago. One of the greatest farms in this country, connected with the name of a very prominent man, is a farm which did great work for the stock interests. I refer to the Bow Park farm. I do not know that I could indicate better the trend of agriculture than the change that has taken place in that farm. It is now a very successful dairy farm. The Mayor has referred to the importance of Brantford, and I might allude to the importance of this Association and the industry which it represents. We represent half the Province of Ontario. We represent the largest industry and by far the most important industry in Canada—the cheese-making industry. This particular Association, as you know, represents an annual output from the cheese factories of this western district of five or six millions of dollars, or if you take the by-products of the industry, it will probably be a great deal more. When I say that I think it will impress you with the importance of this Association, and will give you some idea of the character of the men whom you see before you. We have had to-day a most successful meeting, and I am delighted to be able to tell you that the prospects for this convention in your city are very good indeed.

The year before last at Stratford, and last year at Woodstock, we had the largest gatherings of farmers in these two places that were ever seen in the Dominion of Canada to discuss agricultural topics. That is saying a great deal for the Western Dairymen's Association. I do not know whether you can equal that here, but I will say this, that I remember five years ago being here, and during the most interesting part of the programme, during the best day of the convention, there were not more people here than there were this morning; so that augurs very well for the success of your meeting. We have an excellent programme for this evening's meeting and for the day meeting as well. I believe this convention is to wind up in a sort of blaze of glory on Thursday night in a banquet which is to be given by the Board of Trade. You will have a rather unique meeting. I was at Guelph the other day, and I drew attention to the fact that never in the history of this country did we see two Ministers of Agriculture, together, both of whom were farmers. That is rather an interesting state of affairs. That is what was there, and that is what we will have at this meeting. We are going to have Mr. Dryden, Minister of Agriculture for Ontario, and Mr. Fisher, Minister of Agriculture for the Dominion, and we have with us on the platform to-night the most eminent exponent of agriculture in the United States of America. I refer to ex Governor Hoard. We welcome him here because he always comes to this country, not only as an unrivalled teacher of agriculture, but he comes as an ambassador of peace and good-will between two countries that should always be on terms of friendship and amity. In addition to this, we have a number of other men here. We have our good-looking friend, Mr. Derbyshire, the "Adonis" of both Associations. We have our friend, Mr. Monrad, one of the best teachers of dairy matters there is on the whole of this continent; and then we have two representatives here from the dairy interests of Quebec. It is with special pleasure that I see a representative of the sister Province of Quebec here at this time. We are one people and there should be nothing to separate us in politics, creed or racial lines—nothing to separate us from our friends of the Province of Quebec. When we go down there we always get a cordial welcome, and when they come up here, I know that you will make them feel that we are one people, and that we are all Canadians. (Applause.) In conclusion, I say to Mayor Elliot and the citizens of Brantford whom he represents, that we accept in a cordial spirit the welcome he has given. I am satisfied that we will enjoy ourselves while in the city of Brantford, and that this convention, through their efforts, will be a magnificent success.

## A VISITOR FROM EASTERN ONTARIO.

Mr. Derbyshire: I assure you that I meet with the western part of our Province with great pleasure. As you are perfectly aware, at the present day the dairy forces of the Province of Ontario are being centered into one great Association, one great movement for the bettering and building up of the butter and cheese industry in this great Province. There will be no east or west in connection with the new movement that we are now inaugurating. We are delighted with this. Our good friend, Mr. Pattullo, has just told you I represent two Associations. I was president of the Creamery Association, but you are aware that at a general meeting of these Associations in Toronto a few weeks ago the three Associations were formed into one Association for the Province of Ontario, so that the legislative body will consist of six representatives, three from the east and three from the west, who will have control of the dairy movement of the Province of Ontario. We will have two Boards, one east and one west. We ask the dairymen of the western part of the Province to accept the position and take hold of it heartily and do all they possibly can to carry out this programme, and to make it more successful than any dairy movement that has ever taken place.

I congratulate you, sir, on the grand programme that you have provided for the people of this Province, and for the grand provisions you have made in every way. I am satisfied the meeting will be successful; you have a magnificent hall here; you have a grand people in this locality, and I am satisfied that to-morrow this place will be filled

with representative men from all over the Province. At our meeting in Brockville we resolved to do more than we ever did before to make the dairy business successful. We take first place in the manufacture of cheese in this country; we furnished fourteen million out of twenty-six million that the Old Country at the present time imports; we have done more to advertise the Province of Ontario than any other industry in the land has done. No doubt the Mayor of this city feels proud of the grand manufacturing concerns we have here, but none of those things have done anything in comparison with dairymen to advertise your country. See the position we took at the World's Fair, carrying off 95 per cent. of the prizes for fancy cheese. See the position we took at the Indian and Colonial Exhibition at London. It is for us at the present time to make a further step in advance with this great Province and the people we have got in it. We are in a position to step into new fields and make further conquests, and we can do and we shall do more in 1897 than there has been done in the past. I thank you for the kind reception I have received at Brantford, and I trust you will be successful and that the dairy movement will have another forward advance. I thank you very much, and I know this convention will be successful.

## A VOICE FROM QUEBEC.

Mr. McDonald, M.P.P., President of the Quebec Dairymen's Association, said: Your worthy President should have told you that although I have a Scotch name I am a half-breed. (Laughter). If I had a French audience in my presence I should feel more at ease than I do now. It was with much pleasure that I received the kind invitation of the Western Dairymen's Association to attend this convention. Our Association has done wonders for the cheese and butter industry, like yours in Ontario, in improving the quality of the product. Our Dairy Association had a dairy school established in St. Hyacinthe where we have had for the last four years from two to three hundred scholars attending. Ten years ago our Province had not more than four hundred cheese factories; to-day we have in the Province of Quebec nearly fourteen hundred cheese factories and nearly four hundred butter factories. This is due principally to the work of our Association in supplying this large number of factories with competent makers, and our school has done wonders in that connection. Our Association has created provincial syndicates, twenty factories joined together, and the Association supplies them with an inspector who has had his diploma at our school. That inspector goes round to the factories once or twice a month, and this inspector teaches the maker to make cheese as uniform as possible, because you all know if we want to keep the reputation of our cheese we must have it uniform in quality. Three years ago our Association was alarmed by the large quantity of cheese that was made in this country and exported to England. As you know, the English market is the only market for our cheese, and the consumption of cheese in England is not more than twenty-six millions of dollars worth; this country exported nearly two-thirds of the consumption. Our Association thought it was time to revive our long-lost butter trade, and we sent a delegation to Ottawa to ask them to give us refrigerators in order that we might export our butter in a fresh state, and the answer they gave us was that they were afraid we would not have enough butter to fill the refrigerators. In order to have the Minister of Agriculture supply us with refrigerators we went to the Quebec Government to bonus us with one cent per pound for all butter that was shipped from Montreal, after inspection. There were fifty or sixty butter factories signed an agreement with the Government that they should export every week two days of their make, and on that account they were to receive one cent per pound bonus. Our object was not to make farmers benefit by that, but to deliver on the English market fresh butter every week, in order to show the English that the Canadians could make good butter. Because in years gone by we used to export interior butter, the Government told us the butter trade was a thing of the past. Three years ago the exportation of butter to the English market was not over $300,000, and last year the exportation was over $800,000; and when the English consumers finds out the Dominion of Canada can

supply them with good butter, they will be glad to get it, and I have no doubt this year the exportation will reach $2,000,000. (Applause). We have come to this convention to learn something; we in Quebec have learned a good deal from Ontario. It is butter or cheese from the Dominion of Canada. (Applause). We are trying our best to educate our Canadian farmers. I have had the pleasure of visiting that excellent school you have in Guelph. We have not such a school in the Province of Quebec, but we have four modest agricultural schools. To educate our farmers we have established farmers' clubs, and although they have only been established four years there are to-day five hundred of these clubs, which comprise forty thousand members, and our agricultural journal, which was read by only four thousand, is now read by fifty thousand. To stimulate the zeal of the cheese-makers this year we have established a competition. On a given day a despatch is sent to seventy-five or eighty cheese factories or butter factories, "Send at once one cheese or one tub of butter this day's make," and three competent men are there who judge the butter and the cheese and award the prizes (from $5 to $20), and a bulletin is sent to all to tell them the defects of the butter and cheese. This competition had the greatest effect in our Province. As Mr. Pattullo has said, we are not English-Canadians or French-Canadians, we are Canadians (applause), and let us work hand in hand to make this Dominion of ours a bright and happy country where the sons of Canada will be glad to live together. I hope that at our next convention in the Province of Quebec the dairymen of the Province of Ontario will be represented, and we will then show you that we are doing our utmost to keep up with the rich Province of Ontario. (Applause).

## ADDRESS.

By J. A. Monrad, Secretary Illinois State Dairymen's Association.

I would much rather go down and milk twelve cows than talk to an audience of people that were not interested in practical butter and cheese making, and it has been my experience that at these evening meetings we meet a great many of the town people. I feel bad, because I thought it would be necessary at least to carry a barrel of soft soap with me, but when I arrived in the hall and saw so few of the town people, I thought it was about time to abuse the town people that were not here. I am in earnest Mr. President when I am speaking on this subject. I feel the town people do not take enough interest in the farmers in their work; they do not sympathise enough with them. They forget that they are suffering privations, they lack facilities for sending their children to schools, and yet upon the prosperity of the farmer we all rest, every profession, every one of us. There is not a tradesman, carpenter, shoemaker or blacksmith in this town, but his prosperity depends on the prosperity of the farmer. If the farmer goes in for dairying he will get his bills paid much prompter than if he had not gone in for dairying. As to the lawyers, they might say that they are losing a good many cases in selling out mortgages, but I think they will have a recompense in the will cases, disputing over money that has been made by dairymen, so I think that even lawyers are interested in the prosperity of the farmers. There has been a great deal of talk this afternoon, criticizing the farmer. There is some ground for it, and yet Mr. President, I think the keynote has not been touched, and that is we want to get nearer the farmer in order to reduce the cost of production. The farmer to be a successful farmer must be a business man. There is the weak spot according to my idea

We cannot control the price of butter and cheese in London, but we can control the cost of production of milk. And how is this to be done? Simply by stopping milking cows at a loss. I will venture to say that if your Secretary would go out and test the cows on twenty farms right in this section he would find that where they milk ten cows, they would find four cows that if lightning struck them it would be a good thing for the farmer. I was astonished the other day by seeing in a Danish paper that actually out of two hundred cows which these poor Danish farmers are milking morning and evening

the cost of production varied from 15c. to 78c. That is really astonishing. I knew the average was low. On one farm they milk forty cows ; seventeen of these produce butter at a cost higher than it is sold for. You town people have farmer friends who come in and talk with you and complain about low prices. Is there a storekeeper in this town that could afford to sell seventeen parts out of forty parts at a loss ? The trouble is they will not test their cows. I want every business man who has any connection with farmers to preach that in time and out of time. It is like the Salvation Army—it is real salvation work. I want to preach it always unto the farmers to treat their cows so that they will know what they are doing. You would not hire a man and pay him wages for twelve months and then let him loaf for five months. You would not pay him unless he worked sufficiently to give you a return for your money.

## ADDRESS.

By C. C. James, Deputy Minister of Agriculture, Toronto.

Fifty years is not a long period. We have on the platform here to-night men who can look back over that period. In 1847 there was not a mile of railroad in this Province In that year they were just beginning to put up the poles, and operate the first telegraph system in this Province ; the sewing machine was just coming into operation, the first. reapers were being used for the first time, to any extent. It was not until 1864, or seventeen years later, that the first cheese factory was established in this country, and thirty-seven years later that the first butter factory was established. Although we consider that half a century is but a very short period, yet when we look over that time, we find it has wrought wonderful changes in connection with this country. The dairy industry is comparatively a new industry in this Province, yet it has assumed very large proportions. Putting together the dairy butter and the creamery butter, the milk sold in towns and cities, and the milk consumed upon the farms, the annual output of milk and its products for the Province of Ontario amounts to about $37,000,000. That is certainly a most important industry. Now, we have had a wonderful development of late years in connection with the life of the towns, and there has been wonderful development along manufacturing lines. Even the youngest of us can look back and call to mind the development that has come through the introduction of electricity, the telephone, the electric light, the electric street cars and electric motors. These have followed very rapidly one after the other, and the result has been that the attention of the citizens of this and other countries has been largely directed to the great advance made along this line, and we are apt to think at times that agriculture has not made such rapid progress.

Now, the result of that has been very marked upon the minds of the people. So many improvements and advances have been made that our papers are daily filled with records of the new work, and the minds of the people of the towns and cities have been filled with these things, and have been comparatively blank in regard to advances made in agriculture. I have mentioned one or two points already that will bear out the point I am trying to make, and that is that marvellous advances have been made in agriculture. It was not until about fifty years ago we had the first introduction of the labor saving machinery in the shape of the reaper. That has been followed by one machine after another, until now we find many of the best farms in this country as well equipped with machinery for their work as your factories are for their work.

Upon what does success in any line of work consist ? Mr. Monrad gave us an instance of where there was a difference in the cost of production varying all the way from a few cents up to seventy-eight cents per pound for butter. I received the other day an advertisement from a dairyman living near Chicago, who advertises to sell his milk at a rate of twelve cents a quart. He gets that price, simply because he caters to certain demands in that city, because he conducts his business upon a certain line, because

he has made himself an expert at the work. He has gone into it as a business with as much intelligence and care as any manufacturer in the city of Brantford does in connection with his business here.

Why do some men succeed and others fail? One reason for the success of some men is that they like their work. As a rule you will find that where a man likes his work sooner or later he will make a success of it. You cannot expect a man to like his work unless he thoroughly understands it, unless he educates himself, unless he gets a knowledge of his work. I contend that this and other associations are doing a very important work in this country by bringing the cheese makers and butter-makers and the dealers and all who are associated with this dairy industry to a better understanding of their business. The question presents itself to our minds: Is there as much in this business as there is in other lines of business? Is there as much chance of development? Does it take as high a stand as other great lines of work? A young man is going into electrical work. He does not start in without training, but right from the first he finds out as much as he can about it. He seeks those men who are best skilled in that line of work, and then he tries to keep up with the times. I do not think the farmers and dairymen have been urged to the same extent to bring themselves into harmony with their work, but rather they have struggled along as best they could against difficulties, and, as Mr. Monrad has said, they have struggled, as perhaps no other people have struggled. They have carried on their work at a loss in many cases. If men in other lines had carried on their work as they have in agriculture, they would certainly have gone to the wall. There is no other business in the Province that would have survived as much ignorance as this great agricultural industry.

You have noticed the growing up of our agricultural journals, the multiplication of associations, and the great increase in the meetings held all over this Province in the interest of agriculture. You have perhaps also noted that the number of pamphlets and reports distributed among our farmers has been growing year by year, until now the farmer has at his disposal as much information as the people in the towns and cities have in connection with their work. I think we can truthfully say that young men who are engaged in agriculture have as wide a field and as good a scope for the development of their intellect as have the people of the towns and cities. It has suggested itself to me to refer to a few cases in particular that will illustrate this claim, and to point out that there are things to be learned in connection with agriculture in its varied applications that require men of as good mind and of as clear intelligence to grasp them as do the greatest scientific propositions that have been applied in connection with our town and city industries.

We understand in the first place that all these industries are based upon the soil. Is there anything to be learned in connection with the state of the soil? We sometimes think that dairying consists in simply the production of milk and the turning the milk into butter and cheese; but if this business is to be put on an intelligent basis we have to go back of the milk and the food given to the animals and the production of the food upon the farm; in fact we have to go back to the soil and the climate. Now, is there anything in connection with the state of the soil that opens up a field for study and investigation that should attract the attention of the young men and the older men who are trying to make a special study of this great industry? I shall instance just one thing, and I shall give you the record as it appears in one of the late numbers of the report of the Royal Agricultural Society of England. You know that one of the richest foods to be produced upon the farm is clover, and allied with it are a number of other crops, such as peas, beans and tares—leguminous crops as they are called. They are not always the easiest produced, but they are among the richest foods produced on the farm. These have been studied year by year, and, at last, after a long period of careful observation on the part of men who have been working not only in the fields but also in the laboratory, it has been found that these crops of a leguminous nature have the ability of getting some of their food from the air by means of little knots or nodules that grow upon their roots. You can see these nodules on pulling up some of the plants. Now the question is what part did these play in the feeding of the plant? After careful study and observation it has been found that these little nodules were filled with small organisms somewhat resemb-

ling what we all know as yeast, a very low form of plant life, and these minute organisms growing on the roots of the clover are able to take up nitrogen out of the air and pass it on into the plant. Sometimes plants do not thrive well because these are lacking, and you can now purchase some of this yeast-like substance and scatter that over the fields where you grow your clover crop, and by the action of the organism a fermentation will be started which will enable these clover plants to grow much more vigorously than they otherwise would.

Is there anything to attract the attention of our intelligent agriculturists with the production of plants? Did this question ever strike you in this way? Take the wheat crop of this country. Supposing we could increase the production of that crop in the Province of Ontario by just one bushel per acre, how many millions of bushels would be added to the total product? If we could increase the wheat crop and the oat crop and the barley crop and other grain crops we grow by a very small amount per acre, there would be added to the total wealth of this country an amount that would foot up to several millions. There is opened up a field for profitable investigation by the young agriculturist. Then consider the horticultural department. Take the production of a new variety of fruit, and you have an almost unlimited field for study and investigation. A great many years ago a young doctor in the city of Boston failed in health. He was advised to give up his practice, he did so and went out into the country, and there began to cultivate a small garden. One day he came by chance upon a small grape vine, a seedling which seemed to him to be promising, he cared for it, and out of that seedling has grown the Concord grape, and out of that variety we have a great many varieties, of which, perhaps the best known is the Niagara. Now by the care bestowed upon that one vine he gave to the whole continent of America several grapes which have brought millions and millions of dollars into the pockets of the fruit growers of this country. We might mention other fruits, such as the Wilson strawberry, the Baldwin apple, the Crawford peach, and many others. In most cases they are not the result of chance; they have been carefully guarded and sent out by men who are working along this line and are doing it with the utmost care and closest observation. Every year or so new varieties of fruit are being brought out, and this affords an interesting field for the study of our young men.

Then we find one of the greatest foes of the crops of this country in the form of insects and parasites, the loss occasioned by insects and disease to the crop of grapes in North America annually amounts to many millions of dollars, perhaps several hundred millions. No man can intelligently farm, no man can intelligently produce crops of any kind, no man can grow grops for the production of milk to-day, who does not know something about insects and parasites which are yearly attacking the crops he produces. There alone is an extensive field which is just being opened up to the careful student on our farms. Some years ago in California the orange crop was threatened with complete destruction by an insect which had come in, they did not know from where, but it increased with such rapidity that the entire crop of California was threatened with extinction, and the fruit industry appeared to be doomed. Word was sent to the entomologist at Washington, and the question was asked what they were to do under the circumstances. An expert was sent on to investigate, and he found the destruction was being wrought by an insect known as the scale insect, an insect which lays its eggs upon the side of the tree and covers them over with a scale, so that before they are hardly noticed they are hatched, and the whole tree is at their mercy. This expert at once identified them; he knew more than that, he knew there was another country in the world from which these had been brought; Australia was their original home. He knew further, that in Australia they had no trouble in keeping down that insect, and he came to the conclusion that there must be something in Australia to keep them in check. For instance when the English sparrow was brought to this country they increased with wonderful rapidity; now their enemies have increased and we do not see such rapid increase in the English sparrow. The expert knew that there must be a match for these insects in Australia. After a great deal of persuasion, a man was sent to represent the Government at the Australian exhibition then in progress, and this man was commissioned to find out what was keeping down these insects in Australia. After a while he

began to ship back to the United States the enemies that he had found. They were a variety of the "Lady Bug." These were let loose in California, where they increased with such rapidity that the insects which threatened to destroy the orange crop were kept in check. The same thing applies to the various forms of insects to be met with on your farms, and the man who is going to meet those insects must study them and learn the methods whereby they can be combatted.

We turn for a moment to dairying. Is there anything that will develop a young man and arouse enthusiasm in this department? Is there anything in it to study, or is it simply a humdrum commonplace job? Well, I think you will find if you study it carefully, that there is just as much to be learned in the investigation of the dairy question as any other field I have mentioned. Notice the wonderful development that has taken place through the introduction of machinery. The result has been that we have built up our cheese production solely upon the basis of the factory system. The last year we produced about a million dollars worth of butter in the factories, and six and a half millions worth of butter upon the farm. Why is it we have so little butter to go to the Old Country? Largely because we are producing such a small quantity in the factories and such a large quantity in the home dairy. If we can only turn over this six millions and a half of dairy butter into creamery butter, then we can go over and possess the home country for butter. No doubt you were very much surprised when Mr. McDonald, of the Province of Quebec, told you here that the butter of that Province had gone ahead of the butter of Ontario; they have outstripped us in butter and we have outstripped them in cheese-making. There is another great field opening up in connection with dairying that presents a most attractive field to young men. If the question had been asked five or six years ago, what do you mean by ripening of cream or milk? you could not have got a satisfactory answer. Now we are having that question answered. Five years ago if you had taken a farmer into a laboratory and shown him a microscope and told him that was going to play an important part in the development of the dairy industry in this country, he would not have believed it; yet that little instrument, which appears to have no connection whatever with the dairy industry or any other part of agriculture, has been brought to bear upon this subject, and now we knew that just as the changes in the soil are produced by the low organisms, so changes are wrought in the milk by organisms so small you cannot see them. These minute organisms are working changes, some of which are favorable, and others not favorable.

It becomes important to know which are which, and how the favorable changes may be encouraged. By the study of these minute organisms—that which we call the department of bacteriology—we place this work of dairying on a new footing. Now you find one of the most important questions for discussion is as to what changes take place in milk, what produces these changes and how these changes are controlled. Five or six years ago you could get few, if any, works upon that subject, and to-day the young dairyman who wishes clearly to understand his business has at his disposal text books and materials, and he can go about his work as intelligently as does the young man who goes into professional life, or the manufacturer or mechanic in towns or cities.

We are apt to think these small things are of no importance. You find a man working over some little thing, and you say there is nothing in it. You may say some of the men who are to speak at this convention will bring up topics that are not practical. The study of these questions in connection with agriculture have already resulted in new methods of work and practice. When I meet with an argument or statement of this kind I am always reminded of a little story I read a great many years ago. You will remember that in the early days when electricity was first being talked about Franklin thought he could prove to the people there was electricity, not simply in the earth, but in the clouds, and the people laughed at him. He said he could prove it to them, and he would bring the electricity from the clouds, and he sent up a kite and it disappeared in the clouds and no electricity came down. After a while the cloud began to spill itself upon the earth, and the rain came down until not only was the kite wet, but the cord, and the cord which would not bring down the electricity before now, when wet, conducted it down so that those who held it could feel it for themselves, and they said to him, "Supposing we admit

there is electricity there, of what use is it?" Franklin said, "Of what use is a baby? The baby will grow and some day become a man." Now that which seemed to be a baby, and was a baby in Franklin's time, that which apparently had no practical application, has now been made a force of every-day application, sending our messages on the telegraph, running our street cars and even driving machinery upon the farm.

I have simply one more word to say, and that is that Mr. Dana, the editor of the New York Sun, in a lecture which he gave last year to some students, said he had been accustomed to have his paper conducted along certain lines. He laid down certain principles, and one of these principles was as follows: "All the goodness of a good egg can never make up for the badness of a bad egg." I want to change that a little and leave it as my parting word to the members of this convention. Success in cheese making, success in butter making, and the building up of this which is now our greatest industry, depends upon keeping this ever in mind: "All the goodness of a good cheese will never make up for the badness of a bad cheese. And all the goodness of a good pound of butter will never make up for the badness of a bad pound." (Applause.)

## ADDRESS.

By Ex-Governor Hoard, Fort Atkinson, Wisconsin.

This is a great big world. We occupy but a small space in it, but we rattle around in that space in the limited time of our existence, and we think a great deal of ourselves. In hearing these speeches which have been made to the effect that you are one country and one people, I have thought how beneficent was the work of the cow in bringing you to that understanding. (Laughter.) You may disagree as Frenchmen and Scotchmen and Irishmen and Germans and all, and you may disagree on religion. Things we cannot prove we will fight over. Nobody fights over the multiplication table, and yet the central truth and the progress of human thought and human endeavor is the same whether you are born from a French mother or from half a dozen mothers; and it is really a question with you in the Dominion as with us; the unification of human effort along the lines of the betterment of mankind. If we can disabuse our minds of the fact that we are Frenchmen or English or Yankees or Canadians, and address ourselves to the practical questions of what is the truth, whether it be in the dairying or anything else, we would give ourselves an impetus along the line of what we most desire.

I have been introduced to a large number of audiences in Canada, and I do not see but what you love and hate and contend and eat and drink the same as I do. In my work as a lecturer on dairy topics, I have gone from the furthest part of your eastern Dominion as far west as here and in my own country, from Colorado to Idaho, and in the western States, down to the southern end into Texas and Tennessee, and everywhere the great problem is the same, and men are addressing themselves to this question, and it makes me love to think I am a dairyman. It is that hospitality, that mental hospitality of soul, that makes us what we are. Now, my friends, I have nothing very particular to give you to-night. I believe very profoundly in the truths of this question which we are here to discuss, and I believe in the oneness of mankind, and I do not believe very much in division lines, or in the national lines or in any style of lines that bar me in any sense whatever from reaching up alongside of my fellow man for the sake of promoting truth. (Applause.)

Now the cow. Oh, the cow, wonderful mother! She is indeed, she is the foster mother of two-thirds of the race. We must be fed, and the cow must come to our rescue in many instances; and so she becomes a wonderful basis for the promotion of the purposes of civilization—this thing we call civilization to-day. This improved order of existence, this improved order of conduct, this improved order of government, this improved order of thought, all comes from the constant devotion of the man who thinks more than the man who works. I never got such an illustration of this in my life as I

did once from the lips of a poor negro who, only forty days before, was a slave, owned by another man. It was immediately after the occupancy of New Orleans by the Federal troops, and I remember the crowd of soldier boys standing together; and this negro in their midst. He had been born a slave. He belonged to the estate of the Hotel St. James, and had been raised as a waiter in that hotel, and had clandestinely learned to read and write. He kept his knowledge to himself, for it was contraband. He was in many respects the most original thinker I ever knew. We were discussing General Grant, and one of the boys said "Grant is not a smart man; Grant has no talent; he cannot make a speech. If a man knows anything he can say it, and if he cannot say it it is mighty good proof he doesn't know it." The negro said "May I say a word?' "Yes." He then uttered this analysis of humanity. He spoke with a clear and perfect diction: "According to my observation there are just two classes of talent in this world; both must be thinkers, and both must think towards expression. So much abortive thought never reaches expression. The first class must think towards expression in words; to that class belong your poets, your orators, your writers and your public speakers. The second class must think towards expression in deeds, and it is to this class that belong your painters, your sculptors, your architects, your managers of great business enterprises, and your generals; and I cannot see by what right we have to measure the greatness of one by the greatness of the other." It was so true an analysis of humanity that I felt like taking off my hat and thanking that poor negro. At that moment the repulsive character of human slavery rose up before me and I said, "My God, and that man a slave!" The physical slavery was not anything to the fact that that mind was owned by another man.

And just as clearly and closely as he becomes a true architect, shaping things to a harmonious result, thinking it out clearly, will the farmer become the best expression of his profession, therefore I wish I could get the farmers of this country to see the wonderful nature of the intellectual relations of this business called farming. The weakest man we have in American society to-day, the weakest in contention for his own best interests, is the man who has got a hard hand and a soft head. It would be much better for him did he reverse the operation. Things must be wrought out and I know what it means to engage in the most laborious labor for the sake of producing a result: I know what it means to attempt to think out a proposition rather than work it out, and I know of the two that it is the most exhaustive process to attempt to think the truth rather than to constantly work for the truth. In my contact with men I have found many times marvellous reaches of thought among simple men, and men have taught me wonderfully. Let me give you a little illustration right in my own county. About twenty-five years ago Agassiz, the great naturalist and scientist, said in a speech delivered at Boston, "Thure Kumnelin is the best authority in the world on birds' nests." He lived in a little place in my own county peopled mainly by Norwegians. This little utterance on the part of Agassiz travelled into the Chicago papers. "Thure Kumnelin the finest authority in the world on birds' nests." I was somewhat of an enthusiast on natural history, and I hitched up my horse to find who he was. I came within the neighborhood and I accosted several people and I asked if they knew who Thure Kumnelin was, and they said, "Who do you mean—that crazy old Swede?" "Crazy," I said, is he crazy?" "Well, I should say so." "What makes you say he is crazy?" "Why that old fellow is out there night after night on the marsh with lantern and net catching bugs. Anybody who was not crazy would not do that." So I drove to his little humble log house, and I found there a man dressed in a simple attire, and engaged in the study of the profoundest problems of life. I commenced to talk with him, and I found him suspicious, but finally ingratiated myself into his favor. When he found that I was interested somewhat, it was disclosed to me that that humble thinker and worker in that little log house was in correspondence with all the scientific societies of Europe, a graduate of the University at Copenhagen, a magnificent Greek and Latin and Hebrew student. Profoundly educated; profoundly intellectualized. Every particle of that vast store of learning he had devoted to this one proposition "What is the truth about the bug or the bird?" I spent many hours and days and weeks with him afterwards, and one day we were shooting on the lake for canvas-back ducks and he had killed a splendid

specimen, when he addressed it in this way: "Oh, what would I give to know what you know about the great unexplored north!" Only a few years ago an English naturalist penetrated to Asiatic Europe across the Arctic circle, and there found where the canvas-back duck nested. Heretofore an unanswered question in natural history, that wonderful bird taking wing from across the Arctic circle far across Behring strait, down across the continent, and I had found them in our county, no doubt not having stopped from the time they left their nesting place. So in this work of the dairy question we ask of every man first and foremost: "What is the truth?" With thousands of men the truth is wrapped up in a dollar note, and you will find them here losing sight of the truth in an attempt to encompass it by: "How much is there in it for me?" No advance has been made in these lines. Mr. Ballantyne said the other night in the banquet at St Mary's that when he was a boy he heard his father congratulate a famous baker in the old country who had amassed a great fortune, and he said to him "I compliment you on your having made money so wonderfully." And he replied, "I never gave a moment's thought to the making of money; all I was after was to make the best article that could possibly be made, and the money made itself." I love to see a man take a kingly pride in his work. An old Irishman once dug a ditch for me, and he did it so evenly, there was so much real perfection in that ditch, that I took off my hat to him and said: "O'Brien, this is a ditch fit for a king," and he made me a very handsome bow and said "Sir, the O'Brien's were kings once." He was right. They were kings of Munster and Leinster, and that kingly blood had left in him a kingly pride in the digging of a ditch. Now my friends, if I have said one single word that will give to the humblest man within reach of my voice any encouragement in taking a brighter and stronger and deeper hold upon his life work, I shall have accomplished more than I can hope for.

## COMMITTEES APPOINTED.

*Resolutions*—Messrs. Andrew Pattullo, J. N. Paget, Thomas Ballantyne and the Secretary.

*Dairy Utensils*—Messrs. T. B. Millar, J. B. Muir and I. W. Steinhoff.

*Nominations*—Messrs. George Hately, chairman; J. A. James, Robert Robertson, Robert Johnston and James A. Gray.

## CARE OF MILK.

By T. B. Millar, Kincardine.

On this subject a great deal may be said, but as the time is limited I will try to make this paper as practical as possible, taking up as little of your time as is necessary.

In the first place I would like to give you a slight idea of how I find the milk as delivered at factories. In the summer months, when the milk is being poured into the weighing can, you will quite often find it off flavor, as "gassy," "sour" or "cowy." These three are very common, but there are innumerable other flavors. In the fall months such flavors as rape and turnip are frequently met with. The first three can be avoided by careful attention, the only remedy for the last two is in not feeding to milch cows rape, turnips, or any other food that will produce bad flavored milk. Amongst the weeds that give bad flavors I would mention the leek, the ragweed and the wild camilla. It is therefore the duty of every patron to see that these weeds do not exist in his pasture field. Then again, tainted milk may be caused by cows drinking dirty or stagnant water, lack of cleanliness in milking and in the care of the milk, neglect of straining and airing immediately after milking. But the chief cause of bad milk is *dirt*—dirty milk pails and cans, dirty milking yards and dirty hog pens too near the milk stand or the place where the milk is left over night.

A number of the patrons do not strain the milk, and if you take a look at the strainer in the factory while the milk is being delivered, you will see a sight that for *variety* would be hard to equal and harder to enumerate; but all these things tend to give a "highly flavored" article. The milk for factory purposes is to be manufactured into food for human consumption, and should receive the most careful attention. Only the milk from healthy cows having a plentiful supply of pure food and water and free access to salt daily should be used. The milkers must be clean and tidy, using only tin pails, and should immediately after milking strain and thoroughly air the milk, handling it always in as cleanly a manner as possible until delivered at the factory. Milk that is sent to a factory without being strained should be returned to the patron at once, as it is not fit for the making of a first-class article of cheese.

All milk should be aerated; the sooner after milking the better. By aeration is meant the thorough exposure of the milk to the air. This may be done by pouring with a dipper, or by allowing the milk to run slowly through small holes in a vessel, the milk falling in fine streams through the air into the milk can, or it may be run through one of the many aerators offered for sale by the dairy supply dealers. By aerating the milk animal odors and bad flavors escape, but to be of use the aeration must be performed in a pure atmosphere. Milk that has been aired will keep sweet longer, other conditions being equal, than milk that has not been so treated, but the chief advantage claimed for aeration is that the milk is of a much better flavor. Where patrons of factories have practised this system they find that it is not necessary to cool milk with water even during the hottest weather. *Thoroughly air the milk until cooled.* Milk keeps better in small quantities, and when two cans are used the evening and the morning milkings should not be mixed.

The milk stands should be constructed so as to protect the milk from sun and rain, and should be in a clean place away from anything that is likely to give the milk a bad flavor. When the whey is returned in the milk cans, it should at once be taken to the hog pen and emptied, and not emptied into a barrel by the milk stand to be used as needed. This latter is positively a filthy habit, and should not be practised by any patron.

After the pails and cans have been used they should be washed with tepid water and scalded thoroughly, then placed where they will get plenty of sunlight. A cloth should never be used in the dairy after a vessel has been scalded, for if the water is as hot as it should be (boiling) the vessel will soon dry off itself. Never use soap on tinware as it is apt to leave a soapy flavor, but clean occasionally with salt, which is much better and will leave your tinware in a clean, sweet condition.

In conclusion, I would say that pure milk can be obtained only through healthy cows, pure food, pure water, pure air and cleanly handling.

Mr. I. W. Steinhoff: My experience is more with the handling of milk than with the care of it. I think we all certainly agree with the points brought out in the paper. It is a good paper. A number of excellent ideas have been thrown out, and good ideas will stand discussing and criticising. In some particular points my experience is a little different from that advised by Mr. Millar, especially in using soap in washing milk utensils. I have found that weighing cans, conductors and all utensils through which milk passes are to a certain extent greasy, and I have found that the quickest way to remove that was by the use of a little hard soap. I would not use a soap that had an objectionable odor. Take the hard soap and rub it on with a brush, then wash the can. I think it removes the grease and leaves the cans clear, and if you rinse them well with hot water they smell sweet. There are many other points that might be mentioned, but I leave them to be touched on by others.

Mr. A. T. Bell: Does Mr. Millar approve of cooling milk in the summer season?

Mr. Millar: It might be well to cool milk through the very hottest weather, but it is not a safe plan to do so. You know so many people think that if milk is sweet that is all that is necessary. My impression is that if patrons cool milk in water they should aerate it. I would not recommend the system at all; I would say air your milk thoroughly until it is cool, and you will have no trouble with souring.

Mr. MONRAD: If the temperature is 90° in the hot weather, how low can you cool the milk by airing it?

Mr. MILLAR: 90°.

Mr. MONRAD: Don't you think it better to cool it down to 65° or 70°?

Mr. WOOLEY: What is the best system to cool milk? If you have a quantity of milk it is a slow process to cool it by the dipper?

Mr. MILLAR: There are a great many ways to aerate it. Some approve of the dipper, I prefer the aerator. It is simple, and easily kept clean.

Mr. H. WHITE: Did you ever use a little salt and scrubbing brush to keep your cans clean?

Mr. MILLAR: In the vats we always use salt and a hard brush.

Mr. WHITE: Would not that be as good as soap?

Mr. MILLAR: In my opinion it is better; it will take off that greasy matter and leaves you a clean flavor. There is a danger of getting a soapy flavor where you use soap.

Mr. GRAY: Have you ever tried sal soda?

Mr. MILLAR: I have never used it in that connection.

JOHN BLAYNEY: Will you tell me how to keep Saturday night's milk over till Monday morning for cheese making?

Mr. MILLAR: You must cool Saturday night's milk. It is impossible to keep it from Saturday till Monday morning without cooling it, and be sure to air it thoroughly. So many people forget the aerating; it is necessary in order to get rid of the bad odor and the bad flavor. You all know when once milk is cooled it is impossible to get rid of this flavor.

Mr. GRAY: Would you advise cooling Saturday night's milk by putting a block of ice in it?

Mr. MILLAR: No; but I have known people who have cooled it in that way, and have done it very innocently.

Mr. TRAVIS: Have you ever had any experience with an aerator and cooler?

Mr. MILLAR: I have not seen one for some years. That is an apparatus where the milk trickles over an open vessel holding cool water, it both aerates the milk and cools it. I think in the ordinary way you could keep milk from Saturday night till Monday morning quite sweet by that plan. I have read of this aerator and cooler combined, but have never had the good fortune to see one in use. I think it would be a good plan.

Mr. MONRAD: I think that is an excellent plan. However, I do not quite agree with friend Millar on the cooling question. I like to both aerate and cool, because we have had the assistance of science in this matter, and if, perchance, there is any bad bacteria in our milk, by cooling we restrain it from development in a wonderful degree. If you were to cool it right down to freezing point they would not develop at all. If you left it at about 90° it develops so that one bacteria in a few hours would be several hundreds. The reason why practical cheese makers do not like to have it cooled is this, that if we cool it the lactic acid bacteria don't develop, consequently they have to take a longer time to ripen their milk when it gets to the factory. While aeration must stand as number one I place cooling very close to it—that is to say, to give the cheese-makers perfect control over the development of the bacteria which he has got to use in cheese-making. There is another little point in which I want to take issue: I say soap is a very dangerous thing. There are so many poor soaps used. Pure soap would be all right if the cans were carefully rinsed out. I think there is too much danger in recommending soap, and I do not like to hear it recommended. I have learned one thing and that is the use of salt. I have never tried it. I can recommend sal soda or any alkali that will cut the grease. When I was farming in New Zealand and had more wood ashes than money, I used wood ashes.

Mr. J. Martin: I will tell you how I clean tins. I take Gillet's lye, put some in water and use it on the tin to cut the grease off, then I take salt and a brush and scour it thoroughly and then wash it with water. I do not wipe the tins, and I have no trouble in keeping them sweet. The lye removes the grease; using the salt over the lye will make the tins clean and give them a good flavor.

Mr. Steinhoff: There is a point mentioned by Mr. Millar I wish to bring out I do not know whether all will agree with me or not, but I have received milk that was very objectionable through the feeding of leeks. I have never yet smelt leeks in cured cheese.

Mr. Monrad: Will you tell us how to eliminate the leek flavor?

Mr Steinhoff: I think it passes off in the process of manufacture. When curing you can smell it on new cheese, but by the time it is become twenty or thirty days old it ripens and I think the flavor passes off.

Mr. A. T. Bell: I have the same experience as Mr. Steinhoff. I returned leeky milk until I knew more about it, and I have taken it in when it smelt very strong of leeks, but I have never been able to detect it on cheese. I wrote to Prof. Decker to have him explain it, but he said he could not. If the milk is heated over it will pass off more readily than otherwise.

Mr. Monrad: I think if you get a little leeky milk you will find it in the cheese, I do not care whether it is two years old. I think, however, if it is not too strong that by heating the milk say to 120° or 140° then cooling it off the leeky flavor will pass away. In cooking the curd we heat it to 98°. In stirring it would drive away the leeky flavor, but if you get a strong leeky flavor I doubt if you can get rid of it.

Mr. Steinhoff: Have you followed it through in cured cheese and detected it?

Mr. Monrad: No.

Mr. Steinhoff: Many a time I have returned the milk, but of late years I have manufactured it. If you heat it to 90° and let it cool to 86° it seems to pass off.

Mr. S. R. Lee: Would you advocate feeding leeks? There are lots of leeks in this country of ours; I have a patch and I could give my cows access to them.

The President: I may say years ago I used to find leeks in cheese, but I do not find them now because I do not think we have so many leeks. I never forgot the leeks we had in our early cheese. The last few years I do not remember getting leeks at all.

Mr. Lee: Mr. Millar said one of the causes of bad odors was the cows getting bad water. I would like to ask him whether he has had any experience from the cows drinking the whey?

Mr. Millar. Not to my knowledge.

Mr. Martin: I have had no trouble in detecting leeks up to the time you dip, but I find that the flavor works off.

Mr. Lee: My idea is that we should abhor that which is evil and cleave to that which is good. (Applause.)

Mr. Ballantyne: I have not run across any leeky cheese in recent years, but I have been sitting here listening to the discussion and wondering what it was all about. If we were to gain anything that was good in advocating that we could feed leeks without any danger, there might be something in it.

The President: We would like to hear from you on turnips.

Mr. Ballantyne: We do not want any turnips. We find when we send a man one shipment of turnipy cheese, we hear from him for the next year. He will probably write us 100 letters about one shipment of turnipy flavored cheese. In several cases where we find turnips have been fed, we paid less for the cheese. If farmers want to sell their cheese at 7c. they can keep on feeding turnips. I have seen some who said they could feed turnips and it would not affect the milk, but I think that the cheese had a turnipy flavor or a strong flavor of something else they had put in to kill the turnips.

Mr. TRAVIS: Have you had any experience in the pasturing of rye?

Mr. BALLANTYNE: No, I have not.

Mr. MILLAR: Yes, I have had some experience, and I would say that if rye is pastured when it is young, it is good fodder, and if you allow the cows to pasture on it, for, say only an hour after milking it would be all right; but if you allow it to get rank and strong you get a bad flavor from it. We have lots of other feeds besides that, that will produce better milk and more of it. Why not do away with these feeds which cause bad flavor in the milk? The people who are producing rye and rape and turnipy milk are producing it at a loss. Why not grow corn and mangels?

Mr. LEE: I want to know if you object to the Greystone turnip as well as the Swede variety?

Mr. MILLAR: Yes, every turnip. (Applause.)

Mr DERBYSHIRE: With regard to turnips I may say that we have done away with them in the eastern section already. We can grow corn more profitably than turnips. Corn fed judiciously is the best food for making milk, and I think it is wise for everybody to set their foot strongly against the feeding of turnips to the cows. We cannot afford to make anything but the very best butter and cheese. I was watching them making butter at the Agricultural College, and you could smell the turnip flavor as soon as you got inside the building. They were cooling the milk down and doing everything they possibly could to get rid of that turnipy flavor, but they could not get rid of it. It will be there for evermore, and it will injure the price of their butter two cents a pound, and besides we will lose our reputation. We want the best reputation for the very best goods on any kind that we send out. It is of the greatest importance that we educate our people to give us proper raw material. Stop raising turnips for any purposes except to feed to steers, and I do not know but what it will flavor the beef; some say that they can smell it in the beef. I do not believe that myself, but I would not raise turnips. I think they are too expensive in the first place, and in the next they are not giving the right quality of goods. Do not raise turnips.

Mr. WOOLEY: I have been asked to make a few remarks with regard to rye and turnips. We have been hearing from the standpoint of cheese-makers. Now any farmer knows from experience that he can grow corn and turnips cheaper than mangels, rape and carrots. As to rye there is no pasture that a farmer can get so easily in spring as rye, and if he sows rye in August he has fall pasture and spring pasture before he can get any from anything else that I know of. Then that rye before it is in head can be plowed down and the land used for another crop. Corn is spoken of as a good food, but I contend that there is no crop on the farm that a farmer can grow as cheap as turnips. Mangels are not so easily wintered as turnips: they are a great deal harder to attend to than turnips.

Mr. DERBYSHIRE: You did not say what kind of corn you feed?

Mr. WOOLEY: I mean silage. Ensilage is not a settled question; I have inspected several silos and seen different samples of ensilage. I have no silo, and I have never yet found any ensilage that my cows would eat. I could put food right down beside it, and they will eat the food and leave the ensilage. They say you must educate them to it, I think the cow is a better judge of what food benefits her than I would be. What are you to do when your land is too heavy to grow corn? I have had quite a bit of experience with turnips. It affects milk more or less, and it is the same with rye. If you overfeed turnips or if you overfeed rye you will have trouble: turnips cannot be fed alone without seriously affecting milk, but they can be fed with other feed. I had a B. S. A. at my place one time, and we were talking about turnipy milk, and I tried to get him to tell me the turnipy milk. I had a neighbor's milk with no turnips, and he declared there were no turnips in either of them.

T. H. DILLON: I do not grow turnips but I have had quite a lot of experience with turnipy butter. We had one house in St. John's, Newfoundland, that used to telegraph us for butter. They would take 2,000 lbs. a week; they were the best customers we had.

They met their drafts, and they never found any fault with the packages or weights. They took it just as it was. Last fall I shipped them some butter, 3,000 lbs. at 22 cents a lb., and they wrote me back, saying, "That butter was turnipy." I have tried to get orders from them since. I have guaranteed the butter as good as some of the butter they had been getting. They say: "We would like to deal with you, but we are afraid of the turnips." Turnipy butter has lost me four of my best customers. If you send turnipy butter they will buy somewhere else. The English buyers say the same thing. The export buyers say to me, "Why don't these people feed their turnips to something else besides milch cows. We don't want that butter; we cannot sell it." If the people of this Province will take proper interest and produce milk for butter, if they will study the subjects and produce only the best quality, they will in a short time build up a butter industry that will even surpass the great cheese business which they are carrying on now. But they must be careful about the turnipy flavor or any other foreign flavor. I was interested in the discussion about cleaning milk cans. If we could get the patrons to use salt to clean their cans instead of dishcloths I think it would be a good thing. I get milk that has the same smell that you get when you leave a lot of dishcloths in a heap over night. You are taking more milk to make the butter and cheese in Ontario than you did fifteen or twenty years ago. I was very much struck with Mr. Monrad's remarks when he said he had "more wood-ashes than money." I have often been in that fix myself. I think it would be a good way for cheese-makers to get lye for scrubbing. I would not apply it to cans and vats, but to the floors and shelves in the curing room.

Mr. MURPHY: I was one of those unfortunate farmers who fed turnips. We get a much lower price for our goods than when we were feeding other foods. I will tell you what I now feed. I have a farm that I call my home farm. I have no silo on it. I have another farm about seven miles distant upon which I have a man, for whom I built a silo. At home I feed mangels and cut corn, and I produced more milk in November with mangels and cut corn than I did in August. I have a machine that stands stationary in the barn, and I have a horse power we hitch up to it, and cut what we require twice a week. When we cut clover we can cut enough at once to do a week. We take a great deal of care in putting up our corn. I have this to say of the silo. My man on the other farm had ten cows; he sent to another factory, and produced more milk than his neighbor who lived right beside him who had thirteen cows and no silo. (Applause.)

A MEMBER: How did his cows compare with your cows?

Mr. MURPHY: Very little difference. He had mangels, but did not feed them so heavily with ensilage. It is a mistaken idea to think that you should feed ensilage alone. Some people think ensilage should be cut green. You should have the corn matured just before the frost comes. You can cut somewhat earlier if you stack it up, because as you all know stacking helps to ripen it. I grow some turnips and have them stored away to feed the cows with them when they are dry. It is not my impression that I can raise turnips cheaper than I can mangels. Our mangels are thinned and hoed at a time when there is less to do on the farm than when you have to hoe turnips, consequently I think you can do it at much less cost than you can to go through those turnips at a very busy time. I do not think there is any better land you can grow corn on than clay land if it is in a proper state of cultivation, and if you keep the cultivator going. In our section of the country we have all got the silo and we grow corn very cheaply. In our creamery we have over 100 patrons, and we find that those who have silos send nearly double as much milk as those who have not got them.

Mr. LEE: What about the flavor of the milk when the cows are fed from the silo?

Mr. MURPHY: There are no bad effects from it. They have learnt that corn cut in its earliest stages won't answer. They must let it come to the maturity stage.

A MEMBER: Did you have any particular kind of corn?

Mr. MURPHY: Certain kinds of corn do not mature for the silo in our country. This fall I raised a couple of acres of sweet corn to supplement the pasture, and fed it to the cattle ear and all.

A MEMBER: The proper kind for silo you suggest stacking it up to dry it!

Mr. MURPHY: No, not for silo; that is where you have no silo.

Mr. BLAYNEY: Do you cut the corn that you put up into stacks about the same time as if you were going to put it in a silo?

Mr. MURPHY: I cut it a little earlier; the reason is that we grow very much larger quantities of it. Farmers in our section of the country grow from ten to twenty and thirty acres of corn. I live in the county of Leeds.

Mr. BLAYNEY: What kind of corn did you use?

Mr. MURPHY: For corn that is grown for the silo, I plant a row of Yellow Giant, and next a row of Mammoth Southern Sweet, and I cut these right along row after row.

Mr. BLAYNEY: Did you ever try to grow the Mammoth Southern Sweet alone?

Mr. MURPHY: No.

Mr. BLAYNEY: I did once, and I found that it heated up in the shock, and I had to separate it, but I afterwards did as you did, and I had good results.

The PRESIDENT: I am more than pleased to know that this turnip question is being thrashed out. I think a great many cheese factories get these different kinds of feed. I have found that a great deal of trouble has been caused this fall in many factories by patrons feeding apples. I think this is a dangerous thing to do, and the sooner you stop the practice of feeding turnips and apples the better. I think you should feed them to other stock and not to milch cows. Some men may feed these things in a proper way, while other men will feed them so that they will affect the milk; but it is just like starting to light a fire with coal oil—it is a dangerous habit. It is all very well to raise turnips, but if it injures your milk and cheese goes down two cents a pound in price, then I think you are losing money by raising turnips.

## PRACTICAL CHEESE-MAKING.

By GEORGE H. BARR, SEBRINGVILLE.

Before reading my paper I would just like to say to this gentleman who said something about turnips that I am glad that he does not live in our district, because if he did he would have to keep his milk at home and make his own butter. When we started the creamery at Black Creek, in the first two churnings we found some had a few turnips, and it took us nearly a month to get over these two churnings. There is a good deal of difference between a farmer testing his butter in the factory and expert buyers who are at it all the time. We might not be able to detect any turnips and they would. In the township of Downie we have almost as fertile soil as in any place, and they have no trouble in raising corn that grows eight and ten feet. I think there is no excuse for not growing corn, and they can raise as many mangles as they can turnips. We do not allow the patrons to feed turnips. If we know of them feeding turnips we send the milk home.

I feel that to say anything new on the subject of "Practical Cheese-Making" is a very difficult matter, especially when we remember the very excellent paper given on this subject at the convention last year by Mr. A. T. Bell. I do not think a better could be written.

To make first-class cheese during our cheese season it is necessary to have suitable buildings in which to make and cure the cheese. These, I am sorry to say, are not provided for all cheese-makers.

In a great many of our factories it is almost impossible to keep them warm enough in spring and fall, and the curing-room cool enough in summer. And although a cheese maker may do his best to make first-class cheese in a making-room like this it is difficult to reach that mark. If he does reach it, his cheese are liable to be spoiled in a curing-room in which the temperature cannot be controlled. At the Black Creek factory, where I am at present, and where I have been for several years past, the maker does not suffer

from lack of proper buildings or from lack of proper equipment, for I believe this factory is the finest in Canada, and I have included in my paper a description of some of the special features connected with it. It is built and equipped for both butter and cheese-making. The creamery is a room 35x40 at the south end of the building, and immediately adjoining the creamery on the north comes the vat-room, which is 35x52; then comes the press-room to the north of the vat-room, this room being 35x30. The milk is taken in at the two windows on the west side of the building and opposite the vat-room of course. The boiler room is on the east side of the building, and so situated that one door opens out of the vat-room and another out of the creamery into it, and adjoining the boiler room on the south with a door leading out of the creamery there is a very comfortable office, properly furnished, where the maker may do the necessary work on the factory books in comfort and free from disturbing surroundings.

The ceilings are twelve feet high and are finished in black ash oiled; the walls are hollow brick walls built of red brick and finished outside with red mortar; on the inside there is a wainscotting of cement four feet high, and above the cement, white plaster, both the cement and plaster being put directly onto the bricks; the high ceilings, large windows and white walls making an airy and well lighted building.

The boiler-room has a brick smoke stack forty feet high, which is an ornament to the building, besides being a good investment; it will last so much longer than an iron smoke stack, and the insurance is thereby reduced 25c. per $100 per annum. Both the cold and hot water tanks are elevated above ceiling of the boiler room, the cold water tank being high enough to empty into the hot water tank, and pipes connect with both of them to convey hot or cold water to the parts of the building where wanted. A pipe also leads from the cold water tank to the south end of the creamery, and a piece of hose is attached to it there for the purpose of putting cold water into the cans before the milk-hauler leaves the factory, and nothing is more appreciated by the patrons. The water keeps the milk from sticking to the cans and makes them easy to wash.

The whey runs from the vats to a large tank in the ground, from which it is forced 100 yards through pump logs to the hog pens by an ejector; beside this large whey tank there is a smaller tank into which all the washings and waste water of the factory run, and the same ejector forces it through the same pump logs past the hog pens to a large open trench with gravel bottom, through which it filters to a neighboring stream. By this means of disposing of the washings and waste water, the factory and surroundings are free from the usual smell so terribly offensive that is usually looked upon as a necessary accompaniment to every cheese factory.

The curing-room is sixty feet north of the making-room, and is placed that distance away for the purpose of reducing the insurance on this building and upon the cheese in it, the rate charged upon the curing room and upon the cheese in it being seventy cents per $100 per annum, which is the ordinary storehouse rate, and, as you will readily see, is a great saving from the rate usually charged upon cheese factories.

The walls of the curing-room are built of brick, same as the making-room, and the building is divided into two rooms. In each room there are two ice racks suspended about four feet from the ceiling into which we can put ice during a hot spell, and thereby prevent the temperature from getting so high as to do any damage to the cheese. These racks are supported on cross pieces fastened to the upright posts, to which shelving is attached, and galvanized iron underneath the racks conveys the drip from the melting ice to a gutter, which leads to a small conductor pipe that conveys the water out of the room.

In cold weather heat is supplied from a hot air furnace, which is much better than an ordinary coal stove or wood stove; it is much easier regulated, is more economical of fuel and the circulation of air in the room is more perfect. The furnace stands on the floor near the centre of the room; it takes the cold air off the floor, warms it and delivers the heated air high enough to prevent injury to the cheese surrounding the furnace; the top of the galvanized iron casing has been taken off, but the sides of casing remain and are continued about a foot higher than in the ordinary furnace. You will

see from this that there are several new and special features about this factory that all go towards improvement, and might be copied by others with benefit.

MAKING THE CHEESE.

The first and most important matter in connection with this is getting nice, sweet, clear-flavored milk. This can only be done by the patrons being careful as to the food and water their cows receive, cleanliness in milking, airing the milk in a pure atmosphere, and delivering it at the factory in nice, clean cans. If a cheese maker gets milk such as this his day's work will not be a very difficult one. So be careful in taking in the milk. Weigh it correctly, and put the weights down in the book made especially for this purpose. We use one in which the patrons' names are only written once a month; it is well bound, and will hold three or four years' milk. Have the milk in the vat heating slowly as it is being weighed in, stirring gently while doing so. During the summer months it is well to test the milk by the rennet test as soon as it is 80° or 82°. By doing this you find out the condition of the milk, and you are not apt to be caught with overripe milk.

The rennet test has been so often explained that I need not do it here. I will only say, be very careful in using it, and if possible have the same person always do the testing.

To my mind setting the milk is the most critical point in the making of cheese. If you get this done right, with good milk, the curd will come along all right. If you set the milk when too sweet, or let it get overripe, there is trouble all the way along. So be very careful in setting the milk. As a rule I set at twenty-two or twenty-four seconds, one dram of extract to eight oz. of milk at 86°. I would not say that everyone should set at the same number of seconds, but by all means set the milk so that the curd will remain in the whey two and three-quarters or three hours from time of setting to dipping with not more than one-quarter inch of acid on the hot iron.

For spring cheese, April or first week in May, use enough extract so that the curd will cut in from fifteen to twenty minutes—from three and a half ounces to four and a half oz. to 1000 lb. milk. In summer use two and three-quarters to three oz. of extract, cutting from twenty-five to thirty minutes. In the fall use three ounces, cutting in from thirty-five to forty minutes. Have the rennet measured out and diluted in one-half pail of cold water before the milk is quite ready to set, then you will be able to catch it right on the dot. Have the milk in motion before pouring in the rennet, and stir constantly about four minutes, then take a thin stick made for the purpose and pass it slowly from one end of the vat to the other, pushing any froth which may be on top ahead; this helps to steady the milk and keep the cream from rising.

Begin to cut the curd as soon as it will break nice and clean when the finger is inserted and pushed along under the surface, splitting with the thumb. Use the horizontal knife first, hold it plumb and cut slowly; do not rush it through the curd, causing a wave in front of the knife, for this wave causes a great amount of waste. Then with the perpendicular knife cut crosswise of the vat, then lengthwise. This will be sufficient cutting, unless in case of a fast working curd, which should be cut finer. In cutting across the vat with the perpendicular knife I find I can make a better cut by always drawing the knife towards me when cutting than by cutting both ways.

*Heating or cooking the curd.* If using agitators start them slowly immediately after cutting. If stirring by hand I would have the curd stand about five minutes before commencing to stir. Stir for ten minutes before applying steam, being careful to have all the curd free from the sides and bottom of vat before starting steam. At this point it is quite easy to cause a very great waste in the curd by stirring too fast or roughly, so handle as carefully as you would eggs, for if you break eggs you make a bad mess; if you break the curd now you make a bad mess, too. Heat to 98°, having it at that temperature about one and a half hours from time of setting. Try the curd on the hot iron as soon as heating is completed, to be sure it is not coming too fast, and I would advise drawing off part of the whey now. If using agitators take them out and use the rake just as soon as the curd shows acid on the hot iron, raking occasionally, until ready to dip.

*Dipping the curd*, or drawing off all the whey, should be done when the curd shows from one-eighth to one-quarter inch of acid by the hot iron test. I prefer the curd sink with rack and cloth to any other method of handling the curd at this stage. Have a board to put between curd sink and vat when dipping to keep any curd from falling on the floor. The amount of stirring a curd requires here must be left to the good judgment of the cheese-maker. I would only say: Do not stir too dry, as it is easier to get the moisture out than put it in after stirring too dry. When sufficiently stirred, spread the curd evenly on the racks and cover with a cloth made for this purpose. In about ten minutes break into small pieces, setting them on edge, one deep. Ten to fifteen minutes after doing this, turn back again, putting them two deep; next time put them three deep, and keep turning often enough so that no whey is allowed to stand on the curd until ready to mill. This will be when the curd shows a little butter when pressed in the hand, feels smooth and is flaky when pulled apart, usually about one and a half or two hours after dipping. Use a knife mill, and the one that will bruise the curd the least. From milling to salting stir just enough to keep the curd from matting, and do not rub and smash the curd in stirring. In summer I very seldom cover the curd after milling, and for about half an hour before salting give it all the fresh air I can.

During the past season we did a good deal of piling or stacking the curd before salting, piling it as deep as we could, leaving five or ten minutes, and then spreading it out, stirring a few times and piling again. This seemed to give the curd that nice, mellow, silky feel we like to have when ready to salt. Do not salt the curd until you get it that way. Have the curd at a temperature of from 84° to 86° when ready to salt.

Use nothing but the best salt, breaking the lumps and taking out any specks which may be in it. Have the curd spread evenly on the rack, and spread about half of the salt over the curd, rub it well in on the surface, then mix thoroughly. Spread evenly again and put on balance of salt, rub in well and leave for five or ten minutes, then stir thoroughly, leaving a few minutes and turning again before putting into the hoops.

Weigh all the curd, putting the same weight in each hoop. Shake the cloth after each cheese, so that you will not have all the small pieces of curd in the last cheese.

*Pressing.* Put the pressure on slowly at first, increasing gradually for forty-five minutes, when they will be ready to bandage. When bandaging use clean warm water for the press cloths, and hot water for the cap cloths. Do not be in a hurry doing this work; I have no use for a man who bandages one cheese per minute—that is too fast. Be careful to have the bandages lap over each end three-quarters of an inch, and pulled evenly all round and the cap cloths large enough to lap over this. After bandaging put the pressure on gradually as before, putting full pressure on last thing at night. Turn the cheese in the hoops first thing in the morning and press them till after dinner if possible.

When taking cheese out to take to the curing-room wipe all marks and grease off them, and see that each cheese is square and neatly finished.

Put the number of vat and day of month on each cheese, put them on the shelves in the curing room carefully. Do not roll green cheese along the shelves or bruise them, as this causes marks and cracks. Place the cheese of each vat together, and have them look straight and trim on the shelves. Turn them every day, except Sunday. In spring cure the cheese at a temperature of about 70°; in summer use every means possible to keep the curing-room cool. The ice boxes I have spoken of are an excellent thing. I cured my fall cheese this season at 62° and found them cured nicely. Of course this temperature was maintained day and night, which can be done in a good building, with the coal furnace I have mentioned.

I would like to mention a few things which I have learned from the past season's work, namely:

The curds which were three hours or three and a quarter hours from setting to dipping made finer cheese than curds which were two and a quarter or two and a half hours from setting to dipping.

That curds dipped with less than $\frac{1}{4}$ inch of acid made nicer, more silky cheese, than those dipped with more than $\frac{1}{4}$ inch acid.

That curds which were three hours from setting to dipping, and were dipped with $\frac{1}{8}$ in. acid, worked better between dipping and salting than those which had $\frac{1}{4}$ inch or more.

I will close my paper by mentioning a few "don'ts" for factorymen and cheesemakers:

To factorymen: Don't cut your cheese-maker's wages down any lower.

Don't buy a gang press with a tin trough under hoops; have it wooden.

Don't buy a cheese truck with four wheels on it. Get one with three, invented by R. M. Ballantyne, not patented.

Don't expect a man to make good fall cheese in a skating rink without a stove.

To cheesemakers: Don't go and tender for a factory so low that you cannot live, just for the fun of making cheese.

Don't take in bad milk.

Don't over-ripen your milk to hasten your work; you will retard it and make poor cheese.

Don't give your curd more than $\frac{1}{4}$ inch acid when dipping.

Don't wash your curd sinks once a week; wash them every day.

Don't wear the same pair of pants from April to November without washing them. Keep yourself and factory neat and clean.

Don't go in your bare feet in the factory.

Mr. S. Pearce: I have been very much interested, and want to convey to Mr. Barr the thanks of this convention for his excellent paper.

Mr. A. T. Bell: I must congratulate Mr. Barr for his very excellent paper, I have listened to it with a good deal of pleasure and interest. He has entered into the details. He mentioned all the little things in connection with the manufacture of cheese, and I think it is attention to these details that make a first-class cheese-maker. Without taking up any more time, I would ask Mr. Barr what he considers the most important part in the manufacture of cheese?

Mr. Barr: As I said in my paper, I consider the settling of the milk the most critical point. I believe if you get your milk set right, everything else will go right. If you have good milk, I consider cooking the curd immediately after setting the milk next in importance.

Mr. Bell: I consider that the most important point. There are so many who try to get their curd out too soon, so that they will get through early in the day.

Mr. Bothwell: I have been very much pleased with Mr. Barr's paper, and more especially with the discussion of the turnip question. I would like to see this meeting pass a strong resolution condemning the feeding of turnips. In our county they are quite affected by this question of turnips. In our factory we have apopted the furnace for heating the curing room, and this fall we have had better success in curing.

Mr. James Grey: I am sure you will all agree with me that Mr. Barr gave us a fine paper, and that he went into the matter thoroughly. I would like to ask Mr. Barr if he does not think a good deal of our cheese is hurt by overcooking. The cheese are made too dry. I find from my experience that when the curd is dipped from $2\frac{1}{4}$ to $2\frac{1}{2}$ hours after setting I have the best results, I also think a great many cheese are spoiled by too much starter.

Mr. Robertson: Mr. President, I am very much pleased to bear testimony to the condition I found the Strathallan curing room in last fall. I have not seen the Black Creek factory, but I believe it is in the same condition. I have never seen a curing room where the cheese were in better condition, as far as curing is concerned, especially late

cheese. The device is a very simple one. It is not a very large furnace, but it has a good sized jacket, which goes down near the floor and is carried up over the furnace, so that the hot air don't strike the cheese. I was out there one morning before Mr. Bothwell had reached the curing room. It was a very sharp morning, and the thermometer stood at 62°, and the fire had not been built since the night before. I had not seen that before in my experience in any curing room. I have gone into some curing-rooms at 8 and 10 o'clock and found the thermometer at 50°. Mr. Bothwell tells me it does not cost one-half as much to heat the room with this good furnace as it did before. I visited a neighboring factory and found them using two stoves, one for wood and the other for coal. They were using twice as much fuel, and they were not getting nearly as much heat. I think it would pay the factorymen to throw out the stoves and buy a furnace, and I am satisfied they could save more than one-half the price of the furnace in curing the fall cheese of one season's make.

Mr. BALLANTYNE: Do you find the cheese cured as good on the outside of the room as those near the centre?

Mr. ROBERTSON: I did in this case because the heat was circulated through the room.

Mr. MONRAD: What was the outside temperature that night?

Mr. ROBERTSON: I could not say positively; it was a pretty sharp morning, very near zero.

Mr. ELLIOTT: I would like to make one remark in connection with Mr Barr's paper. There was one point he might have emphasized a little more than he did, and that is harmony between the milk producers and the cheese-makers. I was very much pleased with Mr. Barr's paper. I have visited his factory, and it was scrupulously neat, and everything about the factory was as it should be. In other factories that I have visited, they were no credit to the cheese-maker or to the community. We have seen factories in our country that hardly compare with the surrounding buildings of the farms. There is no use of farmers having a first-class quality of milk, and taking it to a dirty factory to be made into cheese. If we are going to receive the best price for our productions, we must have them good from beginning to end; if we cannot get first-class milk on the farm, we cannot produce a first-class article of cheese, and if we do furnish a first-class article at the farm, we want a man at the factory who will keep everything scrupulously neat and clean, and then we are in a position to command the highest prices and maintain the reputation we have gained.

Mr. WOOLEY: I would ask Mr. Barr to tell us about raising corn on this heavy clay he speaks of?

Mr. BARR: I am sorry I am not posted on farming as well as I should be, but as far I can learn from seeing the farmers working their land and their method of handling it, I do not see any difference in the way they till their land and work it. The only difference I can see is that they ridge up their land in narrow ridges in the fall. As to taking care of the corn I cannot see any difference in the way they do it. Mr. Grey asked me if I did not think a great many of the curds overcooked. I used to think so myself sometimes, but I am something like the President, the longer I live the more I know and the more I am to find out. I think the reason we have a dry and stiff cheese is that the curd is cut too fine and then, it is hauled and mauled about too much before it is dipped. If you have good milk and cut your curds with a knife of the usual size, and and work the curds so carefully that the pieces are not bruised, you will find that three hours is not to much. Of course I have agitators. If I did not, I would have it come out in two and three-quarters hours, but with the agitator I find my curds are not a bit too firm when I dip them at three hours. In fact we have got to do a good deal of stirring. During the summer Mr. Bell and I have to make our cheese as much alike as we can. I went down in the spring and saw the way he handled his curds, and there was very little difference in the way he handled his from the way I handled mine. He was not stirring his curd as much as I was, and I went home and stirred mine a little

less. The result was that I got too much moisture in them, and I went back to his factory and found that his slats were twice as wide as mine. I tore mine out the next day, and built them over again, and I found I could get along with as little stirring as he does. I find when the are one-half inch wide that I have got to do a great deal of stirring and have the curds set in two or three hours.

Mr. White: Why would you recommend letting the curds set five minutes before working?

Mr. Barr: I think the curds heal over, you cannot stir the curds as gently by hand as you can by the agitator, and I find by letting them stand five minutes they will heal over, and you are not so apt to break it up.

A Member: Would it not be better to leave it ten minutes?

Mr. Barr: I would not leave it more than five minutes. It will mat when I leave it that way too long.

Mr. Blayney: Would you be kind enough to tell us the average price you got for cheese at your factory last season?

Mr. Barr: I did not think of bringing the report with me. This gentlemen speaks of harmony between the patrons and cheese-makers. I think we are all in the same boat. I think what is of interest to the cheese-makers is of interest to the patrons; while if an honest patron who is using every means in order to supply good milk gets nipped once in a while he feels it, especially when he is getting only six cents a pound for his cheese.

Mr. I. W. Steinhoff: There is one point of vital importance, and I would like to see it fully discussed with regard to curing cheese. I think the difficulty with the fall cheese was principally from two causes—the one was caused by feeding turnips and the other was the curing of the cheese. I am astonished at the way cheese-makers seem to be afraid of fire in the fall; they seem to be afraid of over curing the cheese. I believe that curing is responsible for a good deal of bad flavor. I think the moisture in the cheese turns bitter and sour if allowed to stay there and will give the cheese a "cidery" sort of flavor. One thing is necessary, especially with fall cheese, and that is that they be properly cured; and I was just going to suggest that these important points that have been brought out should be given to the makers before the time they start to make, in the form of a bulletin. It would be a great profit to them. (Applause).

Mr. Wooley: The paper Mr. Barr gave us was an ideal paper and his factory is an ideal factory. I think it would be encouraging for us to know what price he received for his cheese last season.

Mr. Barr: Mr. Ballantyne has unfortunately not got with him the annual report of the factory; the average price for the cheese of the season was 8.81 cents and the average pounds of milk to pounds of cheese 10.71.

A Member: It has been customary for cheese makers to take too much over weight in order to make their averages come near to one another. Some factories do not get so much rich milk as others, and the cheese-makers have been taking from two to five pounds of milk over-weight. Farmers can have scales and we can weigh just as well as the cheese-makers: there are many patrons who are dissatisfied with the weight they receive. I have sent my milk to three different factories, and I find it is the same at one as at the other. I think we should have one hundred pounds for a hundred pounds whether it is milk or anything else.

Mr. Blayney: There is never a quart of milk leaves my stand until it has been weighed. I think there is a great deal in how a man weighs it: I want to give my factoryman his honest due. I have taken my can and weighed it before there was anything in it, and then put the milk in and weighed it and I found that the can weighed a half pound more than it did before; and I reasoned this way, that the milk would never increase in weight in going to the factory. I have weighed four thousand pounds of milk in a week, and there has not been five pounds difference between me and the factory.

Mr. Martin: I have some fault to find with weights. I had some patrons who were finding fault, and I took the maker to task about it, and he declared he was giving them their proper weight and one patron brought an iron weight and weighed it on his scales and weighed the same iron on our scales, and he weighed the same iron on a scales in town and they all weighed the same, and I asked him if he weighed his milk as soon as he milked it? He said "Yes." I told him the milk would lose weight in the night, and he said he did not know that.

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## CURING ROOMS AND CURING CHEESE.

By Mr. J. H. Monrad of Illinois.

Our practical cheese-maker has covered the ground so well that the pen and ink cheese-maker who comes after has very little left to say. There are one or two points I would like to express myself upon before I take up my subject. One is the question Mr. Ballantyne raised by saying individual creameries were the best. It matters not how you arrange it, you cannot make a success of the business unless you can bring together the patrons and the makers. (Hear, hear). I had the privilege of sampling at the World's Fair that famous Canadian cheese. It was two years old, perfectly clean, no sharpness, just the right age, and I said we must give credit to the patrons who supplied the maker, because they must have supplied him with good milk. (Applause).

The trouble with our farmers supplying milk to the factories, be they co-operative or individual, is this, that as soon as they carry the milk to the factory they think their connection with the milk ceases. Now, that is the cause for much of our poor cheese. Each one of you should remember that you are responsible for that cheese uutil it is eaten. As sure as fate you will get it back again if you have neglected your duty in producing good milk. It will come right back, and the English consumers will say the Canadian cheese is not quite as good as it ought to be. I want to take issue with this Association in utilizing the time of the inspectors in testing the milk. I think the factory that does not introduce the system of paying by test deserves to be cheated, and I say that these Associations should refuse to do any testing for them. Now as to publishing the names, as was spoken of yesterday, I was extremely pleased with the straightforward manner in which the cheese-makers were criticised. If you want to raise the standard, Mr. Cheese-maker, you must stand up to the test and be willing to have your name published; if your factory is found dirty it is only fair to those who keep clean factories that it should be published. In Minnesota the Dairy Association send the inspectors into the barns and stables, and they enter in their report that such and such stables are dirty, and I tell you that kind of thing beat all the fines. I understand your inspectors are not appointed by the Government, but I hope you will have them appointed in that way.

Before taking up the curing of cheese I want to touch on the milk. In Switzerland the Custom has been introduced of using what is called the fermentation test. It is impossible to discover tainted milk at the weigh can when the milk is very cold. In Switzerland they take a sample of each patron's milk and place it in warm water, keeping it there for six or eight hours and cover it up and then smell it. Keep it at one hundred and ten, and I tell you gentlemen, if you would call in your patrons and let them smell for themselves these little jars of milk the next day, it would do more good than an hour's talk, even by Governor Hoard. The rule in Switzerland is that a cheese-maker is responsible for the cheese, if it is his fault. But supposing he has a sample of milk and he finds Mr. Jones has delivered tainted milk? If that cheese should sell for anything below the market price it is Mr Jones and not the maker who has got to pay the bill. (Applause) I think we want to do justice to the makers. I want to say that I am a

co-operative cheese factory man. The trouble is that they want to have the cheese made so cheap. You cannot get men of intelligence to make cheese unless you pay them ; the best makers will be driven out if you continue to press down the price of making.

As to curing, I have not been around to see the curing rooms, but I have a fair idea from what I have heard here, and I do not think you are as good in regard to the curing rooms as I thought you were. I thought you were beating the States considerably in regard to that question of curing rooms, but my impression is that there is room for improvement.

As my only personal experience with curing rooms is limited to those that were far from the ideal ones, I feel rather diffident in speaking before an audience, many of whom have experience with the very latest up-to-date arrangements.

My ignorance of the exact conditions in Canadian factories must be pleaded as an excuse, if some of the hints which I am about to give are superfluous.

All cheese-makers of any experience are pretty well agreed on the fact, but how little, alas, do we really know about the phenomenon !

Some fifteen or twenty years ago German scientists lost themselves trying to trace the ripening of cheese by the chemical changes from the chemist's standpoint, and it is only during the later years that bacteriologists like Duclaux, Adametz, Freudenreich, Weigman, Russell and others have tried to let their bacteriological search-light give us a partial explanation.

Among other bacteria, Duclaux found some that developed a ferment he calls "Casease," which he claims changes the hard whiteness of the uncured cheese (curd) to the soft transparent yellowish consistency, which characterizes a fully cured cheese. This description applies rather to the soft cheese, like Brie, but we cannot deny that a similar change takes place in the cheddar.

Prof. Russell, of Madison, Wis., has worked with cheddar cheese, and if I have not misunderstood him, seems to imply that the lactic acid producing bacterium, is the main iactor in the curing of cheddar cheese. He has also shown how it is due to certain gas-producing bacteria (which nearly all belong to the lactic acid producers) when the maker is troubled with floating curds and similar disagreeable incidents.

But, not being a scientist, I shall not venture into deep water where I cannot swim, and the truth of the matter is that these little elusive "critters" have not as yet been tamed and trained, have not been "broken in," if you please, sufficiently to allow themselves to be guided by the hands of even the scientific cheese-makers.

Nevertheless, the experienced cheese-maker will find considerable light by studying this bacterial life. He knows that his cheese will cure better under certain conditions in the curing room than under others ; he knows that certain temperatures are better than others ; he knows that if the room is too dry it is a good thing to increase the moisture by sprinkling the floor with water.

The key to this he will find in the fact that certain of these bacteria need more or less heat, more or less moisture, to thrive at their best.

Curiously enough, while I was revolving these matters in my mind, Prof. Russell wrote me asking if I knew of any literature giving the climatic conditions necessary for a successful cheese country. I take this opportunity to pass this question to the experienced audience before me and hope it will be throughly discussed.

We have enough of the old authorities who, like Joseph Harding, claimed great difference in cheese-making, owing to the different soils on which the cows pastured ; we have also the general historical fact that the best Swiss cheese is made on the Alps, and that the best Cheddar cheese is made in the hilly if not mountainous countries, but is this owing to the climate or to the character of the pastures ?

On the other hand we have that delicious Gouda and the peculiar Edan made in the low marshes of Holland. Again, I say, is this due to climatic influence directly or indirectly ?

Granting that it were possible to grow the Alp rose and other Alpine herbs and grasses on the Wisconsin hills, or even on Illinois prairies, instead of rag weeds, could we get the same result? I for my part feel inclined to say "Yes."

The moisture-laden British islands seem to indicate that such climate is desirable for making Cheddar cheese, but can we provide these conditions artificially even on the hot air blasted Kansas or Nebraska's western prairies?

Theoretically it seems to me that we must say, "Yes," but whether it pays to do so may be another question.

Meanwhile I believe we all agree that it is due to our cheese-makers to place them in perfect command, not only of the temperature but also of the moisture in the curing room, and provide moisture meters as well as thermometers.

Until such a time when our scientists, in cordial co-operation with our cheese-makers, have carried on sufficient experiments to throw more light on the subject, it must be enough to let the experienced makers do the best they can according to their own judgment.

I would also suggest the immediate use of moisture meters and the keeping of a daily record of both temperature and moisture. If such records were kept and reported when cheese are shown at fairs and conventions, we might get some valuable pointers.

As far as my limited investigations have carried me, the relative percentage of moisture, which seems to satisfy good makers of cheddar cheese is between 80 and 85 at a temperature of from 60° to 65°; and yet I venture to assert that in hundreds of our United States factories the moisture is often only from 60 to 70 per cent. and the heat, alas, whatever the outside temperature is, being 85° to 95°.

It is not an uncommon belief that the first room should be dryer and warmer to start with and the second moister and colder. But as far as Swiss cheese is concerned, it seems careful investigations made by Prof Anderegg indicate that if we want a thin rind and a quick cured cheese we must keep the first room warmer and moister than is generally supposed and the second room cooler and dryer.

How is it for cheddar cheese?

Now, as to the curing room, or rather rooms—as there ought always to be two; any construction which will give the maker complete control of temperature and moisture, and at the same time allow him to keep the rooms perfectly aired, will do.

It was at the first meeting of the National Butter and Cheese makers in Madison in 1892, that I suggested the use of the sub-earth duct, but I have been told later that the idea had even then been carried out here in Canada. Be that as it may, I have nothing but good reports from those in Wisconsin who have gone to the expense of building them, and I believe it is the cheapest and simplest way of giving us control of both moisture and temperature. If not, I come here to learn of a better one.

I am a firm believer in short papers and long discussions, and I suggest that we take up the following questions:

First. The one raised by Prof. Russell: What are the climatic conditions necessary for a successful cheese-making country?

Second. Why do cheese makers prefer two curing rooms with a different temperature and moisture, one warmer and dryer to start with, and the other cooler and moister to finish the curing? Is it because we desire to start a different kind of fermentation, or is it to regulate the same fermentation in another degree? We must call on the scientists to answer the latter part of this question.

Third. What is the best temperature and moisture in which to cure cheddars?

And finally, how shall we best construct the curing rooms?

I would like to hear Mr. Millar's opinion as to the climatic influence on successful cheese-making.

Mr. J. S. Pearce: I have been very much interested in the paper which has just been read. Mr. Monrad has touched on a very important point in connection with the work in cheese-making and has used one expression, co-operative, that to my mind is a very important thing for every factory, and if every cheese-maker would keep that word in mind—co-operative—and live up to it he would have less trouble about turnips and apples and sour milk and tainted milk.

Every man who sends milk to the factory must be interested in the output of that factory, and I cannot for the life of me understand why anyone should take chances of injuring himself as well as the other patrons. Mr. Monrad has also touched upon the wages of cheese makers. I think it is high time that the cheese-makers of Ontario should take up this question and come to some understanding. Several instances have come to my knowledge the past summer of great injustice to the cheese-makers, and I for one will be quite willing to do all I can to assist in bringing about some change in the conducting of factories so that the cheese-maker will be protected and not abused as some of them are now. For instance, they are held responsible for results over which they have no control. I do not think cheese-makers should suffer serious loss for conditions over which they have no control. It is getting to be a serious matter with cheese-makers. Their wages are cut down till some have hard work to make enough to live on, and this is not right. The cheese-makers should come together and come to some understanding, and stand up for their rights and not be abused and ground down. It is a serious matter for the future of the cheese industry of this country. We are going to put out all the good cheese-makers if we continue as we are doing. Good cheese-makers are not going to take the wages some of them are now getting.

He has also referred to moisture in the curing-rooms, and I want to say a few words in regard to the curing rooms. I think this is an important question. I saw a few cheese factories last fall, and I say that I have been very much surprised at the stoves that are in some of those curing-rooms. Some factories have not even used ordinary common sense in putting up their stoves. I was in a curing room last fall where October cheese were being cured. There was a large curing-room with a board partition dividing the room into two rooms; in one the maker had the greener cheese and the stove was next the far end and next the outside of the buildings; a small wood stove that would take a two foot stick on end. The greenest cheese were next the cold wall or partition at farthest distance from stove. I made him move the cheese, and compelled him to keep the cheese two weeks longer for that reason. I want you take up this question and discuss it thoroughly, and see what improvement can be made in this respect.

Mr. Pattullo: All of you remember the late H. S. Lossee. He was one of the ablest dairymen this country has produced, and I think he did more than any other man to develop the dairy industry in Western Ontario. His house, his home and factory were the Mecca of the early cheese-makers of this country. His factory was really the first dairy school, and from him went out influences that have made this industry what it is. The feeling of this Association is that we should get up a testimonial to show our appreciation of the services rendered by him. Any member of the Board of Directors will take your subscriptions towards this worthy object. I am sure your subscribing to this fund will be a grand tribute to the memory of Mr. Lossee. (Applause.)

## THE COST OF MILK, CHEESE AND BUTTER

By Prof. H. H. Dean, O. A. C., Guelph.

I do not think we have enough appreciative words of the good work being done by the various workers in this dairy industry. I am sure that we were very much pleased with that excellent paper of Mr. Barr's. There were more valuable hints in that paper than possibly have ever been crowded into one paper or one address, and I was very sorry there was not more time to discuss these points as they came up. I know there were a lot of cheese-makers who would have liked to have discussed the points brought out.

My topic this afternoon is the food cost of milk, cheese and butter. The workers in the whole dairy business may be divided into three classes: The producers of milk; the manufacturers of milk into butter and cheese; and the sellers of milk or its products—butter and cheese.

These three classes are working together, and I notice on the programme that you are giving due attention to all three phases of this dairy industry. We might consider it as a building which we are rearing in this Province. The foundation of this building is the dairymen who are producing the milk. The bricks or the boards or the stones that comprise the walls are the cheese and butter-makers, and the men who are selling these products are the roof. You see they are on the top. Now if this foundation on which the whole industry rests be not a good one the whole thing is going to come tumbling down, and while we may not say that too much attention has been given to the manufacturer of milk or the seller of the milk, I think it will be quite within the mark in saying that at the present time we need to pay particular attention to the man who is producing the milk. You noticed this forenoon that it was almost impossible to keep the discussion from driving into the path of the man who was producing the milk Why? Because this man who is producing the milk is the foundation of this whole dairy business, and every man realizes that where the work needs to be done to-day is to make secure this foundation. We must get it into better shape by some means or other, and in talking to the boys who come into the dairy school, I tell them that I am going to lay special stress on the production of milk. I said to them, you may think that you as butter and cheese-makers are not so interested in that, but our experience is this, that when our boys go back to their factories they write to us not so much about how to make cheese or butter, but they are wanting to know how they can help their patrons—how they can help the man who is producing the milk.

Now you can understand that if a large stone in this foundation comes out, and if another one is almost ready to drop out because there is no money in it for him, that by and by, if a sufficient number of stones come out, our building is going to totter. You cannot wonder that the man who has been producing the milk in the years 1895 and 1896 at the price that was received for the finished product grumbled because there was very little left for him. I believe the manufacturing and selling has been reduced to as low a point as it can reasonably be done on an average of years. I believe our cheese-makers are working to-day at as low or even a lower point than they can possibly afford to work. I think that they should have an understanding so that they will not be continually working against one another, because if we cut down the prices the best men are going out of the business, and if the best men go out of the business it will have the same effect on the walls of our building as if the foundation had broken down. It is only by looking after these things that we can have a perfect and lasting building and a perfect and lasting industry.

I would like to say one or two words on a few points that came up this afternoon. First, in regard to the curing of cheese. Last year I visited quite a number of factories in the hot weather. The cheese was being held by the salesmen, and the grease was running down from the cheese on to the floor. The cheese were open and in some cases off in flavor. In an experiment we made last year we found that cheese that were open in the hot weather should be put in a cool place. We took cheese that were open when warm and a month old, and when they were examined at the end of another month after being kept cool they were quite close, and I am satisfied it would pay cheese factories to have a cool room, a basement cellar or something else that would answer the purpose for keeping cheese cool after being cured in hot weather. I believe we could make a better cheese if we could have the curing process go on more slowly. It is certainly folly for these men to hold cheese in curing rooms where they have no control of the temperature, and I contend it is not fair to hold the cheese-maker responsible for the cheese if you do not give him a proper room to store them in. There is also something wrong with a system which allows the factory manager or patrons to hold the cheese-maker responsible for all milk of bad quality, because it is difficult for any man to detect some of these flavors when the milk is cold.

Some one spoke this forenoon about a B. S. A. who was not able to detect turnips in milk. That may be quite true if the milk were cold, but if you warm that milk up a good sharp fellow can tell this turnipy flavor. Some one also remarked this forenoon that they could smell the turnips at the Agricultural College before they got to the weighing stand. If we were running a commercial enterprise we would send a good part of the milk we get home, but we are placed in that position that we must have milk for the students to work with, and we often take in milk that we ought to send home, but we must take it in or else let the students go without practical work. It has also been charged that our students do not get any practice with tainted milk, but let me say that they get far more practice in that respect than they should have. We do not need to go to any trouble in getting tainted milk ; we have got far more of it than we know what to do with.

In reference to regulating the temperature in the curing room, we have heard a good deal about furnaces. The best way is to have a double row of inch pipes around the curing room, if you have steam in your boiler for the purpose of heating the curing room. I have visited several factories heated in that way in Eastern Ontario, and they give more satisfaction than the furnace.

The Chairman : After the factory is closed, what then

Prof Dean : You will still have to keep on steam in your boiler, and I do not think it will cost any more than the furnace. As to moisture in the curing room, Mr. Monrad laid considerable stress upon that point. We have not investigated that so thoroughly as we probably should have done, but I do not know that there is as much in that point as has been claimed. The only thing I can think of wherein a dry atmosphere is a disadvantage is that it causes more evaporation from the cheese, which causes cracking ; but if your cheese does not crack, I do not see that moisture has so much to do with the curing. If you sprinkle water on the floor it will develop mould on your cheese, and I am not so sure that this question of moisture is so important as we have been led to believe.

## The Economical Production of Milk.

How much does it cost to produce milk, cheese and butter? How much can we afford to pay for manufacturing and selling, and yet leave a reasonable profit to the man who is producing the milk? During this past year, beginning 1st December, 1895, we commenced weighing the food fed to the cows in the dairy herd. Not every day, because we did not have the required amount of labor to do that, but we weighed about twice a month, and the rest of the time the food was measured. This is not so accurate as I would like, but it was as far as we could go. We have a herd of about twenty-five cows ; they represent three different breeds, and the rest are ordinary grade cows. The meals and grains fed to those cows were bought on the Guelph market at market prices. The pasture was charged to the dairy department by the farm department. Our pasture field cost $100. The hay which was fed to the cows was charged at $8 per ton. The mangels were charged at seven cents per bushel. The corn silage was charged at $1.30 per ton. Some may say that it cannot be produced for that. That does not make any difference to us. The farm department was growing it and putting it in the silo, and they charged the dairy department that much for it. Our oats cost us an average of twenty cents per bushel, and two and one-half cents for grinding. Our peas cost us forty-two and one-half cents per bushel ; oil cake, $19 per ton, and our bran this year is $9 per ton, while last year we had to pay $13 per ton. That will give you an idea of the foundation cost of the foods upon which we are building up the cost of milk, butter and cheese. We have one man employed to look after these cows, besides student labor, and we keep from thirty to forty pigs and one horse. I think in that respect we are possibly weak, because if different men go to the stable it is not so good, and I think it costs us more to produce milk, butter and cheese than it would some farmers who have control of all the conditions.

Part of this milk is sold to customers who come to the dairy for it at four cents per quart. Our butter has been sold at an average price of twenty cents per pound ; our

average price for cheese was 8.7 cents. We do not make up each cow's milk into butter or cheese. I will tell you our method of arriving at how much each cow produces. Every night and morning each cow's milk is weighed on a spring-balance, which is kept in the stable, and the pounds of milk are recorded on a sheet of paper on which is written each cow's name. A sample is taken night and morning and put into jars labelled with each cow's name. Every Monday morning these samples go to the dairy and are tested with the Babcock tester, and then we multiply the pounds of milk by the test, and we get the pounds of fat produced by each cow during the week, during the month and during the year. We add ten per cent. to that for the butter. Some people ask, why do you talk about butter fat? why don't you say butter and be done with it? Butter is only about eighty-four per cent butter fat; the rest is made up of varying quantities of water, curd and salt, hence butter is not so constant a factor as the fat.

The people who are getting an increase of fifteen, sixteen and twenty per cent. of butter over butter fat are loading that butter up with water, and some day the man who is buying that butter will find that he has been paying twenty-five cents a pound for water, and that he can get it far cheaper from his pump. This is a live practical question which probably will come up to-morrow. We find on the average ten per cent. increase of butter over butter fat. Sometimes we run over that. Cheese estimates are made as follows:

Experiments go to show that on the average, milk that will make a pound of butter will make about two and one-half pounds of cheese. Our milk, being richer in butter fat, as a rule will make about two and one-quarter pounds of cheese for each pound of butter, so that when we have got the pounds of butter we multiply that by two and a quarter and we have the pounds of cheese. Cows which test three per cent butter fat will make about three pounds of cheese for every pound of butter. When you have about four per cent milk it makes about two and one-half pounds of cheese for each pound of butter.

I have on this chart the food costs of milk, butter and cheese by months in our herd for 1896.

THE FOOD COST OF MILK, BUTTER AND CHEESE BY MONTHS, FROM DECEMBER, 1895 TO DECEMBER, 1896.

The table includes food cost of cows milking, and does not include dry cows.

| Month. | Number cows milking. | The food cost of | | |
|---|---|---|---|---|
| | | 1 gal. milk. | 1 lb. butter. | 1 lb. cheese. |
| | | c. | c. | c. |
| December, 1895 | 16 | 8.00 | 18.8 | 8.4 |
| January, 1896 | 16 | 6.20 | 14.0 | 6.1 |
| February, 1896 | 15 | 5.75 | 12.3 | 5.5 |
| March, 1896 | 17 | 6.30 | 13.6 | 6.1 |
| April, 1896 | 18 | 4.60 | 10.4 | 4.6 |
| May, 1896 | 17 | 2.80 | 6.7 | 3.0 |
| June, 1896 | 21 | 2.00 | 4.2 | 1.8 |
| July, 1896 | 22 | 3.70 | 8.3 | 3.7 |
| August, 1896 | 24 | 5.09 | 12.6 | 5.6 |
| September, 1896 | 21 | 7.74 | 17.3 | 7.7 |
| October, 1896 | 22 | 7.20 | 15.3 | 6.8 |
| November, 1896 | 20 | 5.90 | 12.5 | 5.6 |

You will notice that the month of December, 1895, was the most expensive month we had for producing a gallon of milk, a pound of butter, or a pound of cheese. Previous to this we had not weighed the food given to our cows. One of the most important results of this work is that we found what it cost us to produce a gallon of milk. Every dairyman ought to be an investigator. If you are not making a sufficient number of pounds of butter from the milk you are getting, you should investigate the skim milk and butter milk and see whether you are getting all of the butter fat out. The man who finds that his milk and butter and cheese are costing him too much ought to investigate. It does not take long to find out where the trouble is. We found that we were feeding our cows more than they could profitably use. I hold that in every cow there is a point up to which she can make a profitable use of her food; after that she is simply wasting it or laying beef on her body.

We as dairymen are not particular about this beef question. When we find a cow that has a tendency to turn too much of her food into beef, we get rid of that cow. We found we were feeding all the month of December more to each cow than she could profitably turn into milk. The most economical month for the production of milk, butter and cheese we find to be the month of June, when we produced a gallon of milk with twenty one cows at an average of two cents a gallon. Mind you, this is the food cost alone, and does not take labor into account. In September it increased again, because in that month our cows had practically no pasture. They were in the pasture field during the day time, but I think it would have been money in our pocket if we kept them in the stable and fed them.

When cheese is selling at six cents per pound it is not costing us much to produce a pound of cheese, but it we must not forget that we have to feed the cow when she is producing little or no milk, and we must take that into consideration before we can ultimately settle the question of the food cost of milk, butter and cheese. When the cost of a pound of butter is much over eleven and one-half cents, or cheese 5.2, there is not much money in it for the man who is producing the milk or cheese at the prices paid for butter and cheese during 1896. I think during 1897 we will be able to reduce the cost of that quite a bit, because we shall know better how to handle the cows. We pay a man from $50 to $60 a month to make butter and cheese, and we pay a man $33 a month to look after the cows and handle them in the very best manner, and what we need to-day is to change that. None of us are fond of work, nearly all men work for reward: there are a few who work for love, but most of us are working for what we can get out of it. I hold we ought to do something to increase the knowledge of the proper feeding of dairy cows. I think I may safely say we do not as yet understand the feeding of dairy cows. There is no man who can stand up and say, if you put so much oats and bran and oil cake and mangels and corn-silage into a dairy cow you will get out so many pounds of cheese and butter. In cheese making, we can say if you get good milk, warm it up to a certain temperature, add rennet, cut and cook properly, run the whey off in a certain time, etc., you will get such and such results.

So far I have been discussing the question in a general way, and I want now to come down to particulars and to individual cows, because that, I think, has been a great weakness in connection with the dairy business. Before I speak of our own experiments with individual cows, I would like to refer to some excellent work done by Professor Haecker of the Minnesota Experimental Station.

Those of you who have not seen Bulletin No. 35 of that station should write for it. He found that it cost during the winter time 18.2 cents to produce a pound of butter with the poorest cow or the least economical cow in his herd. The best cow had produced a pound of butter at 10.8 cents, and the average for the whole herd of twenty-three was 13.9 cents for producing a pound of butter. He says the cows were tested at a time when they would do themselves justice, so I presume he tested them in the best condition, whereas in our experiments with individual cows it includes their milking

period over the whole year, when they were dry, when they were giving little milk, and when they were in the flush of milk, and the average of the whole year I have here on the chart:

RECORD OF DAIRY HERD AT O. A. C. FOR 1896.

| Names of cows. | Total cost of the food for year. | Total yield. | | | Average cost of food consumed to produce: | | | Profit. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Milk lbs. | Butter lbs. | Cheese lbs. | 1 gal. milk. | 1 lb. butter | 1 lb. cheese. | On milk sold at 4c. per qt. | On butter sold at 20c. per lb. | On cheese sold at 8.7 c. per lb. |
| | $ c. | | | | c. | c. | c. | $ c. | $ c. | $ c. |
| Margaret | 39 89 | 7,944 | 312 | 702 | 5.0 | 12.7 | 5.6 | 87 15 | 22 51 | 21 18 |
| Belle Temple 2nd | 37 50 | 6,702 | 424 | 954 | 5.6 | 8 8 | 3.9 | 67 70 | 47 30 | 45 49 |
| Birdie | 38 85 | 7,787 | 365 | 821 | 4.9 | 10.6 | 4.7 | 85 63 | 34 15 | 32 57 |
| Pansy | 28 45 | 5,771 | 227 | 510 | 4.9 | 12.5 | 5.5 | 63 87 | 16 95 | 16 00 |
| Annie | 28 23 | 5,341 | 239 | 537 | 5.2 | 11.8 | 5.2 | 57 21 | 19 57 | 18 48 |
| Jennie | 26 69 | 4,028 | 120 | 360 | 6.6 | 22.2 | 7.4 | 37 69 | —2 69 | 4 63 |
| Jessie | 29 48 | 3,780 | 161 | 362 | 7.8 | 18.3 | 8.1 | 31 00 | 2 72 | 2 01 |
| Filpail | 29 60 | 5,006 | 199 | 448 | 5.9 | 14.9 | 6.6 | 56 40 | 10 00 | 9 37 |
| Carrie | 29 64 | 3,979 | 169 | 380 | 7.4 | 17.5 | 7.8 | 34 04 | 4 16 | 3 42 |
| Minnie | 24 36 | 2,389 | 133 | 300 | 10.1 | 18.2 | 8.1 | 13 86 | 2 32 | 2 61 |
| Lisgar's Rose | 30 94 | 5 865 | 325 | 731 | 5.2 | 9.5 | 4.2 | 62 98 | 34 06 | 32 65 |
| Patience | 30 06 | 7,473 | 329 | 740 | 4.0 | 9.0 | 4.0 | 89 46 | 35 74 | 34 32 |
| Maud | 27 14 | 4,147 | 180 | 405 | 6.5 | 15.1 | 6.7 | 39 10 | 8 86 | 8 09 |
| Mabel | 32 55 | 5,683 | 235 | 528 | 5.7 | 13.8 | 6.1 | 58 33 | 14 45 | 13 38 |
| Ont. Belle (8 mos.) | 17 43 | 3,195 | 194 | 436 | 5.4 | 9.0 | 4.0 | 33 61 | 21 37 | 20 50 |
| Scott (38 days) | 3 90 | 777 | 35 | 79 | 5.0 | 11.1 | 5.0 | 8 58 | 3 10 | 2 97 |
| Summer (38 days) | 3 90 | 919 | 49 | 110 | 4.2 | 8.0 | 3.5 | 10 82 | 5 90 | 5 67 |
| Autumn (38 days) | 3 90 | 1,267 | 50 | 112 | 3.1 | 7.8 | 3.4 | 16 42 | 6 10 | 5 84 |

The question has often been asked, "What does it cost to feed a cow for a year?" During my institute experience of six years I have asked that question in nearly every county in the Province of Ontario, and I have never yet seen the man who could tell me what it cost him to feed his cows for a year. Now, as a matter of business, ought we not to know what it costs us to feed our cows? We have a herd of twenty-five cows and we are continually buying and selling. When a cow becomes unprofitable we sell her. During the year, we have perhaps forty or fifty cows, and only fourteen of them were in the herd during the whole year. You see by the chart that the food cost for a cow the whole year varied from $24.36 to $39.89, and the average of the first fourteen cows was $31. I want to ask you this question, if from a cheese factory or creamery you are only getting fifteen, sixteen or twenty dollars for each cow in the herd and no extras, where is the money to be made out of these cows if it cost nearly $31 to feed them? If it costs you anything like what it costs us, there is not much profit in the cow that only brings in an average of $18 or $20. We found the milk given by one cow to be 2,389 pounds, and it goes from that all the way up to 7,944 pounds. I should say that it is fair to say of that first cow that she has been milking since October, 1894 without having a calf. In the year 1895 she gave 1,090 pounds. The pounds of butter have varied from 120 to 424. This 120 pound cow left us in the hole $2.69. I am afraid there are a lot of cows in the country that are leaving the man who owns them in the hole more than $2.69.

The pounds of cheese varied from 300 to 954. When it comes to producing a gallon of milk economically, the cow "Patience," that has not figured before this time, comes into the race. She has got the production of a gallon of milk down to four cents. There is not another cow near her for economical production of milk. There are two cows at 4.9. She is nearly one cent a gallon ahead of any cow on the list.

Mr. HOARD: How do you explain that?

Prof. DEAN: I do not know. She gave 7,463 pounds of milk, and her food cost $30.06. She is a very economical user of food.

A MEMBER: Is that cow a Jersey?

Prof. DEAN: No, sir; she is an Ayrshire. I prefer not to discuss the question of breed, because one is apt to tramp on some man's toes.

Mr. MONRAD: In estimating the food consumed have you calculated the time when they were dry?

Prof. DEAN: Yes; the time they were milking and the time when they were dry. When we come to the cost of producing a pound of butter, this "Patience" is two-tenths of a cent per pound behind "Belle Temple 2nd," which is the most economical producer of a pound of butter, producing it at 8.8 cents.

A MEMBER: What breed?

Prof. DEAN: She is a Jersey. The highest food cost of a pound of butter was 22.2 cents; that was the cow that left us in the hole $2.69. If a man is making butter and trading it out in a country store at 12 to 14 cents per pound, how long will it take him to get rich, if it costs him 22.2 cents a pound to produce it?

A MEMBER: What kind of a cow was this?

Prof. DEAN: An ordinary grade cow, something like the Yankee; she is a mixture of many breeds. We find that the cow that produced a pound of butter most economically has also produced a pound of cheese most economically. Here are two cows that cost 8.1 cents to produce a pound of cheese. If cheese is at six cents a pound, a man must figure to have cows that will produce a pound a cheese for 3.9 or 4 cents, and then he may make something. We found that it cost all the way from 3.1 to 3.9 cents per pound for food to make cheese.

A MEMBER: What was the breed of that cow that produced the cheapest butter and cheese?

Prof. DEAN: A Jersey. The one that produced it at four cents is an Ayrshire. Take this other cow on the list, she is just an ordinary grade cow, such as we bought on the Guelph market. You will notice that she produced 7,887 pounds of milk. She is second on the list in the economical production of a gallon of milk. She stands fourth on the list in the economical production of butter; she is also behind for the economical production of cheese Now, we come to discuss the profit from these individual cows. If all the milk were sold at four cents per quart, these cows would leave a profit over the feed as shown in the chart. "Patience" would leave a profit of $89.46 over the feed, not saying anything about labor. It is a poor cow if you could not make something out of if selling at four cents per quart. The production of milk and selling it at four cents per quart is the most money-making line of the dairy industry we may engage in to-day

Mr. HOARD: What about the fertility of the farm?

Prof. DEAN: You are taking away about $1 worth of plant food in every 100 gallons of milk sold from the farm. In selling butter (the skim milk going back to the farm), there is very little plant food going away from the farm. In selling butter at twenty cents per pound, the first cow made a profit of $87.15. In selling cheese at 8.7 cents per pound you can see how the profit runs from $2.01 to $45.49. If the milk from the latter cow had been sold at four cents per quart, she would have left a profit of $69.70.

Mr. JAMES: Did you test the highest and the lowest percentages of fat in each cow's milk?

Prof. DEAN: The highest would average about 6 per cent., the lowest 2.7.

A MEMBER: What is the average on the whole herd?

Prof. DEAN: About 4½ per cent. fat.

A MEMBER: You have not added anything for labor or for making up cheese or butter.

Prof DEAN: No; I am simply discussing the food cost. The profit that we make rom our cows depends upon the difference between the cost of producing the milk, the cost of manufacturing, the cost of marketing and the price obtained. It is a question that we must study very closely. Before I leave the chart I want to call your attention to another point. You notice this cow, "Ontario Belle," she is a daughter of the second cow on the chart, and was not two years old until sometime in July, 1896. You will notice that from the first of April, 1896, when she came in, until the second December, 1896, she produced 3,195 pounds of milk, making 194 pounds of butter equal to 436 pounds of cheese. There is a heifer that was not two years old when she began milking, and yet I think I can safely say she has beaten the average cow of the Province of Ontario. Have we any guarantee that a cow which is an economical producer of milk, butter and cheese, will transmit these qualities to her progeny? I think I can safely say in this case the dam has transmitted these qualities to her calf. During the time she was milking she produced a pound of butter for nine cents, only two-tenths of a cent behind her dam.

### ONE OR TWO PRACTICAL LESSONS.

I think these results show us the importance of having good cows. That is an old story; it is one you hear every time you come to the Dairymen's convention, and yet it is one that will have to be repeated so long as dairymen gather together.

Secondly, the importance of suitable food. I would say from our experience that we find the most economical, bulky food we have, is the corn silage, and we have not found any bad results in the milk from its use. We have found bad results from leaving the milk in the stable. We now strain it outside of the stable. There is a more or less of a pungent smell about silage, and it is best to get the milk out in the air as soon as possible. If you go to the farm of Mr. Vonwiltonberg, in Holland, where he uses his cow stable in the summer time for curing his cheese, where he has lace curtains on the windows and everything neat and in apple pie order, in such a stable as that it may be all right to strain the milk in it, but in the average Canadian stable beware of it. We find it a difficult matter to get a man who will keep the stable clean, but I think there are a comfortable number of men who expend energy holding down kitchen chairs in the winter time who might spend more time in the cow stable cleaning up.

The next point is the importance of feeding. Feed sufficient to the cow that she may have a surplus over food production. There are so many dairymen go on the principle of feeding her just enough to keep her alive and moving around. The milk we get from the cow comes from the feed she has no use for—comes from the food over and above that required to support her—and if we only give her enough to support her she has none left over for producing milk. There is a tendency among a few feeders to feed cows more than they can find use for.

It is one of the nicest problems in the whole dairy business to know how much feed to give to a cow and not over-feed her, and it is a question that we know very little about. Some men have said, feed a cow so many pounds of silage and meal and you have a balanced ration. But that may be all right to one and not to another.

The fourth point I wish to emphasize is this: That some cows will produce milk more cheaply than others, and yet they may not be the best suited for producing butter and cheese. The man who wants quantity of milk should get cows with that characteristic. If we want butter-fat we must get a cow that has plenty of fat in her milk. We bought three cows on 25th October. From October 25th to 7th December these cows made us a profit that you see on the chart (last three $8 58, $10.82, $16.42, by selling the milk at four cents a quart. These three cows averaged us about forty cents per day in cheese and butter, and about $1 per day in the production of milk, selling it at four cents a quart. I think that fresh milch cows ought to earn us from thirty to fifty cents per day

by selling the butter and cheese made from their milk. How much is each cow in my herd earning me? is a question, I think, we should put to ourselves the same as any manufacturer would put it to the different hands he has employed in his shop and who work by the day. A manufacturer would not keep a man working in his shop unless he was earning him some money.

Mr. BLAYNEY: You have touched on a subject that I have never heard a man touch on, and that is educating a man to feed cows. I think it is one of the greatest subjects that we dairymen can be instructed in. I will give you a few of my ideas. I think, in the future, a dairyman must understand the ability of each cow to consume enough food and not too much. He will find it a very hard point if he has twenty cows, and the probabilities are every one will need a different amount of food. To feed these cows economically will be a problem. There is a large number of mankind who do not know how to feed themselves.

A MEMBER: I would like to know when that cow "Patience" came in?

Prof. DEAN: About March the first.

A MEMBER: Don't you think that milk can be produced cheaper by having the cows come in in the spring?

Prof. DEAN: I think so, if you can produce pasture for $1 an acre. It is a question whether a farmer can produce pasture for $1 per cow per month.

A MEMBER: Do you think it would be better to pay the man that feeds the cows $60 a month and get better help?

Prof. DEAN: I think it would pay.

A MEMBER: What does it cost for feeding each cow?

Prof. DEAN: $31 is our average.

Mr. MACFARLANE: I think I can reduce it one-half.

Prof. DEAN: We have pupils graduating from the College every year, who, I think will make experienced feeders.

A MEMBER: He might be all his life getting experience.

Prof. DEAN: Some men might.

A MEMBER: How many months can a cow milk a year?

Prof DEAN: One of our cows has been milking for two years, and she is not dry yet. I believe in milking the cows just as long as they will milk, and the milk is good. Sometimes after a cow has been milked seven or eight or nine months her milk get stringy and then we dry them up, but it largely depends on how the heifer has been trained. If she has been trained to milk six months she will always milk about six months. Any man who has had practical experience knows you cannot just milk your cows ten months, and do that year after year. You can do it one year and not another; neither can you regulate exactly the amount of feed a cow will eat, or the length of time she will milk. But I think on the average a cow should milk about ten months of the year.

Mr. CLEMONS: Does it pay to have a cow come in every year?

Prof. DEAN: It is just a question. What do you think about it yourself?

Mr. CLEMONS: I think you will get more milk out of ten months than you will milking the cow all the year round.

A MEMBER: How do you dry her up if she won't dry up?

Prof. DEAN: We have milked cows right up to within three or four days of calving.

A MEMBER: When do you expect to dry Margaret up?

Prof. DEAN: She is nearly dry now; if you would like to see her we extend a hearty invitation to you to come and see her.

Mr. MacFarlane: Two neighbors keep nine cows apiece and send the milk to the cheese factory, and one draws double the money of the other, and one spends $30 more in labor on the cows than the other. Which of these two men would you call the practical dairyman?

Prof. Dean: The man that is getting the most money from his cows.

A Member: Which is the best feed—dry fodder corn or ensilage?

Prof. Dean: I think if you have well cured corn fodder there is not much difference in the milk producing qualities of that and silage. But corn fodder is a very difficult thing to cure properly unless you have plenty of barn room. If you stack a lot of it together in the barn it will spoil. If you leave it out in the field you have to chop it out of the snow. I think the silo will pay for the extra expense. But so far as the milk producing qualities go I do not think there is much difference. Some of the American stations have taken up that question and, if I remember rightly, they did not report much difference.

Mr. Bell: Was there ever any experiments at the College as to raising a calf without ever letting it in the pasture field?

Prof. Dean: The time that Prof. Shaw was at the Agricultural College an experiment something like that was made, if I remember rightly, but I cannot give you the details. Our own practice is to keep calves in during the first summer. We turn them out in the evening, but we do not turn them out in the hot days. I think it is a great mistake to turn out young calves and let them run with the cows. I think they are better kept in the stable during the first summer.

Mr. Hoard: Explain to these people that what is called well cured corn fodder is not found on a farm one time in ten thousand.

Prof. Dean: I explained that before.

A Member: Is there any danger in feeding ensilage too long to cows and too much of it?

Prof. Dean: We feed about 40 pounds to each cow per day. A dairyman told me he fed as high as 90 pound of silage a day without producing any bad effect. At the present time we are feeding 35 pounds to each cow, mixed with cut clover hay.

A Member: You said you milked your cows within a few days of calving.

Prof. Dean: I said we did that with one cow, and, if I remember rightly, she milked well and the calf was a good strong, healthy calf, and sold at a good price. It was a Holstein cow.

A Member: Did you find much difference in variation of fat with these different cows?

Prof. Dean: Yes, we found considerable difference. The weekly variation I think would be as much as two per cent. in some individual cows from one week to another.

A Member: What do you suppose was the cause of that?

Prof. Dean: I could not tell you.

A Member: That would not be from week to week in one month?

Prof. Dean: No, this variation of two per cent. would be between the lowest weekly test and the highest weekly test.

A Member: Do you feed your ensilage before milking or after?

Prof. Dean: Before. I do not think that the time of feeding has much influence on whether it taints or not.

A Member: I do. We have had a silo ten years, and we supply people in Hamilton with butter. We feed about 41 pounds of ensilage a day. We commenced

to feed in the evening before milking, and the result was the first time I took butter into town they asked me what was the matter with the butter; they called it strong. Then we fed after milking and it was all right.

Prof. Dean: Are you quite sure it was due to the feeding of ensilage?

A Member: Just as quick as we changed it the butter was all right. We never fed before milking till this winter, and as soon as we quit the butter was all right. The lady I sold butter to kept one pound of butter some time, and after a while the taint went off. Can you tell me the reason for that?

Prof. Dean: I guess it was all due to the woman—how she felt.

## SOME OF THE WAYS OF WASTEFULNESS.

By Ex-Governor Hoard, Fort Atkinson, Wis.

Before entering upon my topic, which is a consideration of some of the ways of wastefulness, I wish to say a word or to on some of the questions which arose during the consideration of this very valuable speech which was so ably presented by Prof. Dean. I want to say a word about that effort of Mr. Dean's. I think you ought to appreciate it most intensely, for it is one of the rarest things connected with our farm work and dairy work to find any man, who has the patience and the ability to hunt the proposition down to its square root, to bring it down to its primal forces. When we can get a piece of work like that it ought to sink into the mind of everybody and there ought to be very few cavillers. One word as to the transmission of the quality from the mother to the daughter. He spoke of this cow "Ontario Belle". She inherited much of the quality of her mother. There is one very important thing for every farmer to consider, the value of registered blood. You may have a great difference in the individuals but remember one thing, that it is the registered blood, thoroughbred blood, that conveys itself most certainly

The difficulty of breeding from a grade cow is that you are breeding from a lot of contradictory lines, you do not know where under the sun the progeny is going to land; consequently every intelligent dairyman ought to keep in the line that he wishes to go, whether it be one breed or another. He ought to keep at the head of his herd a registered sire. I know thousands of men to-day who think they can breed from a grade sire just as well as any other.

I want to say a word on that food of support. That question of how much food a cow will take over and above her food of support is a very important thing. Let me give you some experience with pigs—the law applies just the same. The reason why a Jersey will throw more of her food into butter is because she has been constantly bred to a concentration in that direction. She has not been bred for scatteration; she has been bred for concentration. Therefore she inherits the property of turning food at a very economical rate into butter.

We want to determine the value of skim milk to our patrons. A lot of farmers that are sceptical will not believe what I say. We took thirty-six pigs, averaging 100 pounds a piece, bought them at $4.50 a hundred, and put them up and fed them skim milk alone, to demonstrate to our farmers just what skim milk would be worth when fed as a fool would feed them. We kept these pigs on skim milk alone for fifty-six days, sold them back to the same parties at $4.50 per hundred, and the skim milk netted us twenty-two and a half cents per hundred pounds. Then to demonstrate the wisdom of intelligent feeding, of knowing these principles and understanding them, we took a second batch of pigs at the same price, fed them fifty-six days, mixing the feed with wheat middlings, feeding skim milk and this other food together, and the skim milk netted from twenty-seven to thirty-five cents per hundred pounds. The difference

depended upon the individuality of the pig; you know very well one pig on the same feed will make better growth than another. That individuality is found in every corner of creation, found in your statesmen. You do not send them to Parliament according to their weight in avoirdupois or gross weight. We have got little men in our state who can get away with the biggest man there, when it comes to going to Congress. My friend Mr. Gooderich, thought he would experiment on this question of feeding, and he found 100 pounds of skim milk would make five pounds of pork, when fed alone, that a bushel of corn would make ten pounds when fed alone. But when he fed them together to young animals, they made eighteen pounds These are things worth knowing. The great mistake made by thousands of farmers is undertaking to fatten pork from too old hogs, keeping a pig for eighteen months and fattening it I will guarantee that if he weighs 150 pounds when they commence to fatten him, that 150 pounds has cost two or three times what you got for the pig. Now, I will tell you something that cost us several hundred dollars to find out, and you can have it for nothing. We say that was the highest economic weight of a pig What do I mean by that? That is that weight in a pig when he is making his weight per day at the highest economic rate. And do you know where we found it? At fifty pounds. Up to fifty pounds the pig gives you an increased ratio of gain to food consumed. At fifty pounds he stopped and commenced to give us a decreased ratio of gain to food consumed. What was the reason of it? It is the food of support which tells constantly in the construction of a pig. We found that up to 100 pounds a pound of growth cost us from ten to twelve per cent. more than it did at fifty. And up to 150 from fifteen to twenty-five per cent. At 300 pounds weight it cost from ten to sixty per cent. more to make a pound of growth than it did when the pig was fifty. Thousands of farmers will say when my pig weighs 300 pounds I will sell it. Now suppose he weighs 299 pounds you have got to give him food every day sufficient to hold him at 299 pounds or else he will drop back to 298, and you have got two pounds to make instead of one.

What is that amount of food? The German experiments are the closest I have found, and that is that it takes two per cent. of the live weight of a pig or steer every day in feed to support that animal. Now, suppose a pig weighs 300 pounds, two per cent. of 300 is six, it takes six pounds to simply hold it there. Do you get any money out of that? No. Don't you see that in making pork, that you have first to make it and then to preserve. First make it and then keep it. Farmers do not think of these things. They think all there is in it is the cost of making the pork, and not that food of support constantly cutting from under the profit, and that is the reason they find such a pain in the pocket. So that we found, and all keen feeders have found, that it is necessary to feed young animals—to make your pork when they are growing. Feed your pigs young; do not allow your pigs to go over six or eight months.

So in making beef, you must handle young beef. I have seen them feed four-year old steers with the idea of making money. You might as well try to fatten a fanning-mill by running oats through it. Prof. Dean asked the question about how much a farmer would make on that cow that was all the time taking in the feed of support, so much more than she turned out in the food of profit? The old woman bought chop for a York shilling and sold it at ten cents, and she said she did not see any way of making money unless she did a larger business. It is so with a lot of men in dairying. If they have such kind of cows, they think the only way to do is to get more cows and the more cows they keep, they think they are better off. The risks of the business are greater to-day than they ever were before. The more you populate a section of country with cows, the more you introduce disease. Keeping cows on a farm will not enrich it unless a man does that wisely. Go over to New York, and go right into the old dairying districts, and see how the farms are selling there to-day that have been in the cheese business for forty years, farms that I remember selling for $60 and $70 an acre, sold for $15 an acre last fall. One 200 acre farm sold for $3,000—what is the matter with these farms? What will be the matter with the Canadian farms? This question must be reduced to the proportion of taking care of the farms as well as the cows—making milk by the acre. Our cheese

dairy has been proved to be destructive to the fertility unless we take care, because with every ton of cheese we sell we are selling out a large amount of nitrogen and that nitrogen must come back some day.

Strange arguments are often advanced by patrons when one tries to arouse them to a better understanding of how they are losing money by their negligence, and indifference to well settled principles. When I have appealed to them to put forth more intelligence in thought and action, and have told them that the way they were managing their cows was not the work of well posted men, I would be met with talk like this: "What is the use of doing as you say? Prices are low, and if everybody tried to get 300 pound cows and good stables, and fed in a scientific manner, we would make so much butter and cheese, it would not be worth anything." Now there is no sense whatever in the argument. It is based on the principle that because prices are low, the dairyman should be ignorant and wasteful; because the 300 pound cow makes only a fair profit, he should keep a 150 pound cow that brings him absolute loss; that because prices are low, and only a wise feeder and a good cow can bring profit, he ought to keep a poor cow and feed like a fool; that because only close study and the best intelligence can win success, the less of either he exhibits, the better it will be for him; that because if everybody was wise, it would cause over-production, therefore nobody should be wise and take advantage of the teachings of wisdom. This kind of reasoning is very wearisome. There is no brains in it. Here is a sample of it:

At one of our Wisconsin Institutes, Theodore Louis was talking on the hog. Up jumped one of this kind of reasoners and asked: "What do you feed your hogs, ground or unground feed?"

"Ground feed," said Mr. Louis.

"Do you feed it wet or dry?"

"Dry," was the answer.

"There is where you are all wrong Mr. Louis."

"Why."

"Well sir, I'll tell you. Any man who knows anything about hogs would know better than to feed ground feed and feed it dry. It will take two hours for the hog to eat up his meal."

Mr. Louis looked at him a moment, summoned his hard practical sense, and said: "Well what is a hog's time worth?"

There was a man trying to make money, economizing on a hog's time. He is like the factory patron who sees no use for him to be an intelligent dairyman, because if everybody else was, it would break down the market.

This setting up of some bug-a-boo or straw man, and running hard sensible business by it, reminds me of one more incident. One of these wrongly imaginative old maids was once found sobbing as if her heart would break. When asked for the cause of her grief, she said: "I was just thinking how if I should marry, and have a nice little baby, and it should crawl into that hot oven, and roast to death, how bad I would feel. Bo-hoo-hoo hoo" Do sensible women govern themselves in this way? We are not hoping to move the great mass of farmers who are content to do business at a loss, but we are after the man who wants to do better thinking, better planning, better reading; who wants to make a larger man of himself in dairying, because only in that way can any man in the future hope to make a profit.

### Poor Dairymen and Poor Cows.

Mr. J. W. Wheaton, Secretary of the Western Ontario Association, is authority for the following statement: "We had the factories report the amount paid in dividends at each patron per cow, and found that it varied from $9.96 to $65.50." This was the range in different factories. In the same factory, he found the range to be from $9.96 to

$30 per cow. What does this showing mean, my friends? Let us stand up squarely before it and take our medicine without flinching. The $9.96 per cow was the wages of ignorance and shiftlessness. No other name for it; no other cause to ascribe it to. We must begin to talk to these men in words of truth and soberness. We must call a spade a spade. We must earnestly grapple with this great mass of men who make no profit whatever, but constantly meet with absolute loss, because they will not listen to the truth. They stand in the way of their own profit; in the way of the profit of the community, the county and State There is not the least need in the world for it. You cannot furnish the feed and labor to care for a cow in Canada or the United States for less than $30 a year. So every figure all the way from $9 96 to $30 means loss

Look at the vast preponderance of men who produce milk here in Canada for less than $30 per cow, to the number who get more than that. One Jew said to another: "Nothing succeeds like success." "Dere ish vare you vos mistook," said the other. "Nothing succeeds like a failure." So far as a very large number of our farmers are concerned, there is not a dollar of profit in keeping cows. They succeed only in failure. We are too apt to look at this dairy question in a large way.

To say Canada produced so many pounds of cheese or butter worth so many millions of dollars is worth nothing as a matter of instruction to the farmers who produced the milk. It may make you proud, but it will never make you wise or educate you into an understanding of the great fact that individual profit is the great question. The object of these conventions, the institutes, the dairy schools, the appropriation of government money, is to show the individual farmer how to win profit out of this industry. He gets the least instruction; makes the least money in proportion to capital invested, of any other man in the long line of dairy forces. Is there any conspiracy to beat him on the part of the others? None that I can see. If I thought there was I would turn revolutionist to-day. Does he beat himself? Yes. Is he keeping right at it? Yes, Oh yes What is the remedy? Simply more dairy education for the dairy farmer. How shall he get it?

### Through the Cheese Factory and Creamery.

The farmers had to organize themselves into factory and creamery associations in order to save this immense milk product from waste, and secure for it a place in the world of trade and commerce. Carry the spirit of organization farther; use it to purchase your supplies. Above all use it to promote a true understanding of dairy farm management. Select a good man to take a census of all the cows in each factory, the number of acres devoted to their support, and the food cost each year to each cow. Let each dairy be numbered, and let every fact useful to be known be brought out, put on a black-board and discussed in a meeting every week from November to May. Take two of these herd reports for discussion at each meeting. Resolve to get at the bottom difficulty of this keeping cows at a loss, when other men show a fair profit under precisely the same market conditions. Every factory and creamery ought to be a dairy schoolhouse promoting a saving knowledge of how to make money on present prices. Competition, closer than you have ever seen, is coming to you Canadian farmers in this dairy business. You cannot stop the decline of prices. There is only one road out of the difficulty, you must begin to shape matters so as to keep fewer cows and better ones, and handle those with more knowledge and skill. Work along this line and you will grow, every man of you, bigger than the competition that confronts you. Keep in the old rut when you are, with the same old class of cows, and the same old inadequate ideas of dairy farm management, that don't fit these modern conditions, and you will grow smaller and poorer every day.

But, says some practical man: "Show us how to reform." I cannot, except to point out certain general hints as to the line of procedure:

1st. Commence at once to test your cows with the scales and a Babcock test. Give them a thorough test for three months. Get rid of the poor unprofitable ones as soon as you have determined them.

2nd. Get the service of a first-class dairy bred bull—one who has a strong line of good mothers behind him. Buy him or hire him.

3rd. Don't be afraid to pay a good round price for a good cow, one that will give milk enough to make 250 to 300 pounds of butter. Pay as high as $65 to $75 for her if you cannot get her for less. You will never, on earth at least, place money at so big an interest as she will pay you.

4th. Commence at once to study on this feeding question. Look into it, read into it, practice into it. There is a great profit inside of it. There is a great waste of money outside of it. One of the subscribers of "Hoard's Dairyman" who asked for a feeding ration writes us to say that by using it he made a saving on his seven cows of ninety-seven cents per week, and largely increased their product. The ration was built on cow and feed knowledge. His practice had been to operate without either. Did it pay him to look into it? Calculate what that saving of two cents a day per cow would mean to you.

5th. Make a study of better and more dairy-like stabling and barns. We say dairy-like stables, not steer-like. You are dealing with the mystery of maternity. Stand before it like an intelligent Christian gentleman. You will make money by so doing. Put yourself into the current of this kind of knowledge. You Canadian farmers have great need of a big reform in this matter of building cow barns. If you would travel about more, and look at the cows housed in many wholesome, roomy well ventilated stables where God's blessed sunlight can shine in, where land plaster absorbs the valuable but di ease-breeding gases, and with its forty per cent. of sulphuric acid disinfects the stables every day, you would know how much brighter and business-like those cows look than your own may be. The Canadian farmer, like the Wisconsin farmer, must take in more of these valuable object lessons in cow stables. "Seeing is believing." I have often wished for the sake of their poor cows, that I was able to take some of our filthy stable owners to visit some of the good dairy barns in my state. It would prick down through their indifference to just look at the cows stabled there.

All this talk about tuberculosis means something. It means not alone that there is no profit, but that there is absolute death and destruction in the inhuman, filthy way so many men are stabling their cows. It is no more expensive to build a wise stable than a foolish one. Knowledge here as well as everywhere else does not cost near as much as does ignorance. My ignorance has cost me a thousand times more than has what little I know. Let us get rid of this idea of being afraid to buy a litttle good dairy knowledge.

We get our profit from the horse through his bodily motion. We learn to watch his action narrowly to see if he is in good health and condition. The cow does her work in an unseen way. We must use a different sort of judgment to determine a milking health and efficiency from that of a working character. For this reason we must study the principles of sanitary science more. A great many times in my life have I stepped into the stable of a farmer and felt instantly that something was wrong. I could see the cows were not doing their natural work. When I would speak of it to the owner he would express surprise. He had not noticed anything out of the way. What was the matter? The cows were being slowly poisoned by their own filth and lack of pure air to breath. The owner was paying for it roundly, but it was doubtful if he would pay anything to correct it. Why? Because he did not understand these things. I could see on his countenance the expression, "O that is some of Hoard's theorizing." No man can get good profitable service out of an animal or a machine unless he understands how to keep either in working order. This is not theory—it is hard sense.

SUMMER SOILING.

It has been the cry for years that there was no feed as cheap as pasturage. There is a great deal of delusion in it. There is no form of feed which so quickly deterioates, which costs the cow so much labor and effort at the expense of her milk product to get, and which so often fails.

The increasing frequency of protracted drouths make it a serious problem. A few years ago "Hoard's Dairyman" took up the cry of the summer silo as being the easiest and best means out of the difficulty. Hundreds of its subscribers have adopted it, and are unqualified in its praise. The silo is filled the year before at the same time as the winter silo and is left undisturbed until the July and August drouth comes. The cows are greedy for it, and they give generous endorsement of its goodness and wisdom at the milk pail. Feeding should commence just as soon as the cows begin to show signs of shrinkage in milk. It is of the highest importance to keep the cow from shrinking in order to have her in good flow when the time of higher priced milk comes in the fall months.

The summer silo should be built narrower than the winter silo. The reason is this: In winter you can uncover a large space, for the cold weather will keep it from souring. In summer you must uncover less space and go deeper, if you secure sweet silage. It is also important to keep the surface well covered in summer, between times of feeding. Most farmers are not prepared to believe the real truth of the economy of soiling cows.

At the Wisconsin Experiment Station, three cows were kept during the summer on a dense blue grass pasture. This pasture was at least 100 per cent. better than the ordinary one.

Three other cows were kept in stable and yard and fed with green crops cut and carried to them. The three cows on pasture required 3.7 acres. Those soiled, required 1.5 acres. The yield from the one and one-half acres was as follows:

| | |
|---|---|
| Green Clover, three cuttings | 19,762 pounds. |
| Green Fodder Corn | 23,658 " |
| Green Oats | 23,085 " |
| Waste from the above | 1,655 " |
| Total green material on 1½ acres | 68,160 " |

The products obtained were as follows:

| —— | From 3.7 acres pasture. | From 1.5 acres of selling crops. |
|---|---|---|
| Milk | 6,582.8 pounds. | 7,173.1 pounds. |
| Butter | 303.12 " | 294.75 " |

Thus an acre of soiling crops yielded nearly two and one-half times as much butter when fed to dairy cows as an equal area of good blue grass pasture.

Prof. Henry well says: "On many a farm in Wisconsin the cow suffers more for food in summer or fall than in winter" How many of think that when the cows are roaming the short pastures for food that they are using up what food they do get in this wasteful exercise rather than in the milk and butter they would like to give.

In my contact with the patrons of the Hoard creameries I have sought to get at a sound judgment on this matter. What I lacked in experience on any one point, I could find in their practice. I say to you there is enormous waste going on among our dairy farmers in this general practice of allowing their cows to shrink their milk in midsummer and early fall. There is only two ways to reform it:

(1) Have your cows calve in the fall and go dry in July and August.

(2) Make some sort of special provision to secure a juicy succulent feed in these drying-up days.

I would recommend both plans to be used in conjunction. You must and will dry off the cows at some time of year. Why not do it when it costs the least to keep them and the milk is worth the least?

If you will not think and act on these considerations you must pay for it in the money of wastefulness. Don't think you can escape paying as you go, and how you go.

If men will not pay for wisdom they must pay for ignorance. If they will not pay for good judgment they must pay for bad.

If they will not pay for a saving profit they must pay for a losing waste.

Pay somehow they must. There is no escape from it.

### The Need of Dairy Literature.

One of the most successful dairy farmers in Wisconsin recently wrote me the following:

"I have been striving for years to get my neighbors and brother patrons to see where they failed of securing better success and profit. But it is slow, hard work. They do not see their work in its right light, and of course as long as they have wrong ideas they cannot do right work. The difficulty is they do not read dairy books and literature enough so as to get a good stock of dairy ideas. It was just so with myself. For years I stumbled just as they do, and until I went to reading and got my mind set right on this subject I was a mighty poor *mechanic* in the business."

That man's train of thought struck me at once, and especially his use of the word, "mechanic." He has saturated his mind with dairy ideas, so he can think "dairy," work "dairy," and manage "dairy," the same as a lawyer must read law books and literature before he can think "law," work "law," and manage the "law," in short become a good "mechanic" in the law.

The same principle of mental philosophy governs the growth of a man in dairying that governs in the lawyer or physician. Without the dairyman constantly feeds his mind with dairy thought he cannot hope for financial success in that business. The worst mistake of his life is the idea that he cannot afford the small expense of good dairy literature. Says another: "I can't afford it," is "penny" wisdom and "pound" folly. If you don't want to read and study the newest and best things in your work, you can be assured your work will not progress.

All progress is out of the human brain. If the brain is inert its vocation will be inert. Like Lot's wife, who declined to push forward with every energy, the man who stands still like a pillar of salt will dissolve into failure.

Look about you and see the men who are making a first class success with cows and see if, as a rule, they are not students of the best dairy literature. I have had a wide chance for observing the success or failure of men who handle cows in the United States and Canada. The difference in the financial profit of these men is something amazing. Among my own people it ranges from 25 to 75 per cent. Think of it, two farmers, patrons of the same creamery, with the butter selling at the same price, and one of them making an actual profit of 75 per cent. over the other. The man who makes the most money reads the most. He does not work as hard or as many hours as the other man. He keeps his mind and judgment fresh and bright in this way. If there is a better way of doing a thing he reads of it. He does not waste time and labor from six to ten years before he knows it.

Now it is too bad that so many hard working farmers go along year after year wasting their lives and wearing themselves out to no purpose, because they will not take pains and spare a little expense to be better informed. There are such books as Gurler's "American Dairying," written by one of the finest dairy farmers in Illinois. Every word in it is down to the hard pan of practical farm work, with the cow all for $1. Then there is Stewart's "Feeding Animals," and a splendid work on barn

and stable buildings, costing only $2. There are the dairy papers with the best dairy, thought and experience of the day and age running through them like a constantly enriching stream. Is there any reason on earth why a dairy farmer should shut himself away from the helpful influences of such reading? Yet thousands of them do it. And because they do it they hold and maintain a wasteful way of managing cows. Where there is no profit, always there is waste.

A MEMBER: Does feeding rye affect the flavor of milk?

Prof. DEAN: That was discussed this morning. We have not had any practical experience in that regard. Mr. Miller's experience was that when the rye grows rank, if fed to cows, it will affect the milk, but if fed when young and tender it will not affect the milk.

A MEMBER: Can you produce pork at a profit when you sell it at $3.50 per hundred pounds, live weight?

Gov. HOARD: I think I can if I will handle a pig according to his age and feed him skilfully Corn is selling in our market to-day by the ton, ears of corn, $5, with timothy hay for $8. It seems to me that with pork at $3.50 that I ought to able to turn the skim milk and corn into pork at a profit.

A MEMBER: Can you raise corn at $5 a ton.

Gov. HOARD: I have got to raise it anyway.

A MEMBER: What is the best possible way to save corn outside the silo?

Gov. HOARD: Corn fodder is a difficult thing to handle. I have stacked it and put it in mows, and stacked it with straw between the bundles, and have always been bothered with the juice in the cornstock. It does not dry out for a long time.

A MEMBER: What is your opinion about a cow coming in once a year or every other year?

Gov HOARD: My idea is to start a cow to be a cow as soon as I can do it, and do it fairly; in other words, to breed her at fifteen months and have her become a cow when she is two years old, and forever a cow as long as possible.

A MEMBER: You would have her come in once a year or every other year?

Gov. HOARD: I would have her come in as often as I can. I get beat on it once in awhile. I would under no circumstances allow a cow to run for two years if I could help it, because for the reason that in doing so I set in motion another train of causes, which is simply that which is bothering us all, barrenness, and my observation is that a cow generally maintains her motherhood better than if she is allowed to skip a year.

Mr. TILLSON: I am not a platform speaker, but I will just give you a little of my experience. I am now milking fifty-five cows. I am milking these cows the year round—that is milking them about ten months in the year, letting them go dry about two months. The heifers, when first calving, we milk twelve or fourteen months, but after that we calculate to give them about two months' rest. We keep a record of all the milk we get on a sheet of paper which is nailed up in the stable. ruled off with the dates on the left-hand side, with the number of the cows across the top. We have two date columns, one for the morning and one for the evening. We weigh all the milk for each cow separately. We weigh the milk once a week every Thursday. We copy this sheet off into a large book, and we keep that so as to know year after year what the cow gives. I will give you the average of what these cows give. The last year one cow, three years old, gave 15,000 pounds, another 13,000 pounds; five of the best cows averaged 12,400 pounds; ten of the best cows averaged 11,600 pounds; twenty-five cows averaged 10,200 pounds; thirty cows averaged 9,500 pounds; forty averaged 9,000 pounds; forty-five averaged 8,700 pounds; fifty averaged 8,300 pounds; fifty-five averaged 8,000 pounds. We think that is a pretty good average. These cows are part thoroughbred, part Holstein and

part grade Holstein. We feed our cows principally ensilage, as we think that is the cheapest feed we can possibly give them. We feed them about sixty pounds ensilage a day, and about six pounds of bran, two pounds of pea meal and three pounds of cob-corn, and that feed costs about fourteen cents a day per cow. The cows are averaging about twenty-seven pounds. Of course that takes in all the strippers and the cows we are drying up. We calculate to raise about twenty heifers, and we kill off twenty of the poorest cows every year.

We know which are the poorest cows, because we keep a record, and we test the milk as well as weigh it. A cow that won't pay her board we put into beef as quickly as possible, and we think we are keeping about as nice a herd of cows as you will in Ontario. They are all healthy and in good condition. We water in the stable, a water-box is in every stall, containing pure spring water, and in the pasture we are particular to give them pure water, because we do not think stagnant water is good for them. We try to keep the stable clean, and we use a large quantity of land plaster to draw out the odor. We have cement floors. By that means we keep the stable clean and save all the manure.

A MEMBER: How long have you had these cement floors in use?

Mr. TILLSON: About four years.

A MEMBER: They are satisfactory?

Mr. TILLSON: Yes; they are just made the same as these sidewalks are in the cities.

A MEMBER: What is the average test of your cows?

Mr. TILLSON: Three and one-half; the cow that gave 15,000 pounds, her test is 3 70.

Mr. DONNELY: After hearing the address of the Hon. W. D Hoard, and the backing up of his sentiment by Mr. Tillson, it shows us what can be done in the Province of Ontario, and I am satisfied if we could only take the lesson that we have heard this afternoon to heart there could be a million of money made in the Province next year more than there was in 1896, by careful feeding and taking care of the milk after it was produced. I am satisfied that this afternoon's meeting is the best that has been held, and I am sure that it will do a great deal of good. I am delighted with the record of what has been done in the Province of Ontario. I believe we have a good many men who are doing the same kind of work as Mr. Tillson, but ninety per cent. of the farmers are not doing that kind of work. Over sixty per cent. of the dairymen of this land are not making money to-day. What is the matter? It is because they will persist in keeping an ordinary cow and feeding her in the ordinary way, and not trying to improve everything in connection with the business. A great deal of good would be accomplished if we would only take to heart the lessons we have heard this afternoon.

Gov. HOARD: This cow of Mr. Tillson's gave 550 pounds of butter fat, making in the neighborhood of 647 pounds of butter.

Mr. MCNEIL: One other element in Mr. Tillson's practice that is well worthy of being emphasised. I visited his stables and found they were perfectly warm and comfortable in every respect. They were models, and a marked contrast to hundreds of stables I have visited. This excellent building can be erected as cheaply as a poor one. I visited a stable yesterday that cost not more than a poor one, and it was a model stable in every respect.

A MEMBER: Is there much advantage in taking the chill off the water in the winter season?

Mr. TILLSON: I do not think it is. If I had cold water I would think it would be, but the water I have is as warm as any well water. It is brought about 150 rods in iron pipes, and it is as warm in winter as it is in summer.

Prof. DEAN: Have you found these water tanks any good?

Mr. TILLSON: Yes; I think that is an advantage, because sometimes the cows are thirsty in the summer time, and when they come in they can drink.

Prof. DEAN: Can you keep them clean?

Mr. TILLSON: Yes; we have covers over them, and the cow can lift up the cover and drink.

Prof. DEAN: Would you like to drink the water out of these iron boxes?

Mr. TILLSON: I do not think I would; they are much cleaner than yours are, because ours have water running through them all the time.

Prof. DEAN: We put in quite an expensive system of iron boxes for watering our cows in the stable, and we discarded them for the simple reason because we could not keep the water so that I or any other man could drink it.

A MEMBER: Do you keep your cows in the stable all day, or turn them out during the day?

Mr. TILLSON: In cold stormy weather we keep them in the stable all the time, sometimes for the whole week, but when it is nice pleasant weather we usually turn them out for half an hour or an hour just for exercise.

A MEMBER: Did not you find them giving more milk when you did turn them out?

Mr TILLSON: I think they would give more milk if you kept them in all the time, but I think it is better for the cow's health

A MEMBER: In what way do you fasten your cows?

Mr. TILLSON: I have a chain run round the neck and an iron rod running up in front of the stall and ring round so that they have all the freedom they can have.

Gov. HOARD: Do you keep every cow separate from her neighbor?

Mr. TILLSON: Yes.

A MEMBER: Do you have them dehorned?

Mr. TILLSON: No. I think they look better with their horns on.

A MEMBER: What profit per day do they average now?

Mr. TILLSON: It is costing me fourteen cents a cow to feed them, and they give twenty-seven pounds of milk.

A MEMBER: What do you get for the milk?

Mr. TILLSON: We calculate we get about ninety cents a cow. We are selling the butter for about eleven or ten cents, and we put quite a value on skim milk and butter milk, so that the milk really brings us about one cent a pound and sometimes more.

A MEMBER: That would be a clear profit of fourteen cents a day?

Mr. TILLSON: That is not counting the labor.

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## CONDITIONS FOR A SUCCESSFUL CHEESE-MAKING COUNTRY.

Mr. MONRAD was requested to lead in a conference on the above named subject, and first called upon Mr. MILLAR for an expression of opinion who said: I never thought much about the matter until recently, but I say we consider we have a very good climate in Ontario for cheese-making, as far as climatic conditions are concerned I think what is necessary to make dairying successful is good dairymen—men who can produce milk at a very very low cost—and then we can use artifical means in the production of our cheese.

Mr. MONRAD: We would like to hear from you on the necessity of moisture in the cooling room. Professor Dean laid some stress upon it. If he had been

making cheese in Kansas on a very hot summer day, when the moisture is down to fifteen per cent. he might have given a different opinion. Do you think that is a good moisture to cure cheese in?

Mr. MILLAR: I do not think that fifteen per cent. proper is a moisture at all. I think it is necessary that we should have a percentage of sixty per cent. or upwards. I would rather go above sixty than below it.

Mr. MONRAD: Don't you think that dry air in the curing is apt to give your cheese a very thick rind. If you had more moisture don't you think you would have a thinner rind?

Mr. MILLAR: If it was too dry there would be such an evaporation.

Mr. MONRAD: What is the effect of having it too dry in the curing-room?

A VOICE: Causes the cheese to crack.

Mr. BARR: This season I got from Mr. Ballantyne one of those hydrometers. I do not know how correct they are, but our curing room registered all summer about forty. I think it was about right when it was about fifty. When I got lower than that the cheese seemed to mould and did'nt look so nice as they did when it was up to normal.

Mr. MONRAD: You would believe that between fifty and sixty would be about right.?

Mr. BARR: That would be my opinion according to this instrument.

Mr. MILLER: What temperature was your curing-room at that time?

Mr. BARR: About sixty-five or sixty-six degrees.

Mr. MONRAD: You used ice at that time?

Mr. BARR: No, when we used ice in those ice racks the instrument immediately went down to very moist.

The CHAIRMAN: When did you use ice?

Mr. BARR: Only during a very hot spell.

The CHAIRMAN: I have a question to ask Mr. Monrad with regard to this cracked cheese. I think it is on account of the cheese going to press in cold hoops and cold curing room.

Mr. MONRAD: Don't the Scotch people give us a lesson on that? When I was in a Scotch dairy they made cheese and took it out in the morning and dipped it in lukewarm water to get rid of the fat that was in these cracks and then put it in the press again. Don't you think that fat would help to make those cracks?

The CHAIRMAN: I think these were made from cold weather.

Mr. BARR: I know taking the cheese out and washing them in real warm water will help this.

Mr. A. T. BELL: I think it is the practice with some cheese makers to wash the cheese in warm water in the morning.

Mr. LEE: We had some cheese mouldy in September. Some of the patrons said they had hair on them. I think it was caused by too much moisture. Mr. Millar had one of these hydrometers at our factory, and he said our room was quite dry, and I got a large vessel filled with water, and put it on top of the stove and I found in going into the curing room the air was more wholesome to breathe, and I found that I had no checked cheese on the sides. One gentleman suggested that the cracking was due to cold; my experience has been the reverse. I attribute it to the lack of moisture. I had moisture this year and no cracked cheese in the factory. Our September cheese got quite mouldy. I account for it by the fact that we had not a stove in our curing room until the second day of November. Therefore we had too much moisture. I could see the mould accumulating day after day.

Mr. Robert Robertson : Does Mr. Monrad know of any way of preventing mould in the summer time ?

Mr. Monrad : I think if you would investigate the moisture you would find that it was excessive. When we speak about the percentage of moisture it means that amount of moisture the air can carry before the dew falls. When the air is warm it will carry more moisture than when it is cold.

The Chairman : This mould question is very important. Years ago it did not make any difference whether cheese were mouldy or not, but of late years the English people are finding fault, and we want to do away with the mould if possible.

Prof. Dean : We have had trouble with our cheese moulding during the past years. We find that if the curing-room shelves are thoroughly scrubbed with lye and the rooms kept dry we are not troubled with mould. I think where most of the mould gets on the cheese in England is holding them in ice cold storage.

Mr. Monrad : I would like to ask the chairman, as a cheese expert, whether that cheese is not some of the best cheese we have had ?

The Chairman : I think so, and I would never object to a mouldy cheese. But the people in England think we ship them June cheese for September.

Prof. Dean : Do you know of any way of getting rid of extra moisture in a room ?

Mr. Monrad : Some of the Swiss cheese-makers use dry straw. If it is pretty excessive I think lime is the best, and close the windows during the day and open them during the night. I would like to ask whether a continuous gang cheese press is used in this country ?

Mr. Barr : I think a gang press is an improvement on the upright, and it is easier kept clean. I think a continuous press is the best thing.

Mr J. S. Pearce : With regard to continuous gang presses, I tried to introduce them here. But our cheese-makers did not take to them. We have a spring continuous press here, which has taken the place of the continuous gang press.

Mr. Hopkins : I will just give an experience I had while acting as inspector. I went to a certain cheese factory and they were troubled very much with mouldy cheese, and the manager asked if I could suggest any remedy. The previous spring they had put a stone foundation under the factory, and up near the sills they had a little outlet, and this was all the ventilation there was in the foundation, and I suggested that if he would let a good current of air under the curing-room so as to have good ventilation, I thought this would overcome the difficulty. He followed out my suggestion, and it made a great improvement. In my factory I have a ventilation through the curing-room by letting down windows from the top, and where the current of air goes through our curing-room there is no mould, but below the current the cheese were mouldy. My impression is that if we could keep a current of air through our curing-rooms we would overcome the difficulty of mouldy cheese. Damp dead air in the curing-room is one great cause of mould. I would suggest that anyone who is troubled with mould should look after the ventilation.

Mr. Monrad : I want to emphasize what Prof. Dean says—that when you have mould and want to get rid of it you should wash everything in the room with plain lime water. Of course the mould will come back again if you don't remove the cause, and I think ventilation is a good thing. I want to say a good word for this continuous press.

Prof. Dean : What do you press cheese for ?

Mr. Monrad : To give it a form and keep it there, and to help form the rind.

Prof. Dean : The object of pressing cheese is to make a close cheese, and if we can make a close cheese with the ordinary press it seems to me there is no use going to any expense for other presses. I think if the curd is not right you cannot make it close if you put on ten tons of pressure.

The CHAIRMAN: I often find cheese marked with rusty spots, and I want some cheese-maker to tell me why they do not keep these off; and another question I want to ask is in regard to this cold storage system. In some cases they have kept the cheese too cold. My opinion is that we should only use the cold storage during hot spells.

Mr. BARR: I am afraid that is too hard for me. The time I would like to put cheese in cold storage in the summer time is when the temperature gets over sixty-five degrees. If we had some system whereby we could regulate it at sixty-five degrees we would have no trouble in making fancy cheese. There were times when I could not get the temperature below seventy degrees during the hot spell last year. We have racks in which we put chunks of ice. Our room is about thirty-five feet square, with a twelve foot ceiling.

The CHAIRMAN: With regard to this rust on the cheese, can't you keep your hoops clean and keep them from being rusty?

Mr. BARR: Yes.

A MEMBER: Does your cheese mould?

Mr. BARR: There was a good deal of mould on our August cheese. I think the rust is caused by the carelessness of the cheese-maker. Sometimes cheese-makers have to use hoops that are rusty inside. I would take an axe and break them up.

A MEMBER: You would be apt to be fired if you did.

Mr. BARR: There is just where it is. Our factorymen will not supply things that we should have, and the maker gets the blame for it. Whenever I think about that I get warm. The fact of the matter is that the factories are cutting down the cheese-makers, and binding him down with security. I think that is not fair, unless the cheese-maker has something to counteract this, and can say: "You have got to supply me with first-class articles."

The CHAIRMAN: What about the poor buyer?

Mr. BARR: I have always found the buyer able to take care of himself.

Mr. MONRAD: Have you any sub-air ducts?

Mr. DILLON: With regard to sub-air ducts, they are only about three feet under the ground, and they do not affect the temperature very much. They need to be down about twenty-five feet I think.

Mr. MONRAD: Ten feet.

Mr. DILLON: They are all right to keep up a free circulation of air. I find our cheese mouldy, and we have had to wash them. Of course we have more moisture in the air in Prince Edward Island than you have here in Ontario, and we frequently have to wash our cheese. We wash them with whey and rinse them off with water, and they look just about as nice as when they come out of the press, and I think it is better to do that than to let them go away mouldy. I was interested in the discussion this morning about the curing of cheese. I think the curing of cheese is not sufficiently well understood by cheese-makers as a rule, nor is the keeping of milk understood by patrons. There are large quantities of rennet extract being imported into this Province, and I would like to see the dairymen take up that question, and see if we cannot keep that money in this country. We have some coloring manufactured in Canada now, and I do not see why we should not manufacture rennet extract.

A MEMBER: I would like to ask Mr. Monrad whether he has had any experience in curing-rooms built of concrete?

Mr. MONRAD: I visited a number of Swiss curing-rooms that were built of concrete. They were cellars half underground. They succeeded with sub-air ducts in keeping the temperature down to seventy-five degrees. For Cheddar cheese I am afraid that you would have it too moist without a sub-air duct.

Mr. GREY: Have you had any experience with concrete floors in the curing-room?

Mr. MONRAD: Yes. When I made skim milk cheese in Denmark we always had concrete floors. I know that some makers object to the wear and tear on their shoes. Give me a concrete floor every time and I can keep it clean. I can keep a wood floor clean the first year, and possibly the second year, but when that wood gets old I defy anybody to keep it clean.

## AGRICULTURAL EDUCATION.

By ANDREW PATTULLO, M.P.P., WOODSTOCK.

I come before you to-night with a good deal of diffidence, because I have seen you so thoroughly interested in the subject which you have been discussing for the last hour. Personally, I would very much prefer to see you continue that discussion. I propose to say a few words, as I must condense what I had intended to say, on the subject of agricultural education; and I am sure I do not require to make an apology for speaking on such a subject before an audience of farmers. This meeting is really an agricultural school or an agricultural college. But while this is true, I believe that most people in this country feel that we have not reached the end in the work of agricultural education. In fact we are only beginning. And it is a peculiar fact, and I think a remarkable fact, in this and almost every other country, that while agriculture is the most important industry in the country, the least attention is paid to education in relation to it There is five times as much money invested in the dairy to-day as there is in all the manufacturing industries of the country put together. The agricultural interest is the most important of the country. When we are urging the improvement of agricultural education, we urge the claims of the majority of the population—the majority in wealth and in all that makes the country prosperous. It is a peculiar thing that the science of agriculture is not older than the present century, and did not really take form until the last half of this century. It speaks well for the age in which you and I live that during the last fifty years the science of agriculture has made more progress than in the 6,000 years that had gone before. While this is true, I still maintain that in the matter of agricultural education we are in its very infancy. If I had not been going to shorten my remarks, I was about to draw your attention to what are the agencies we have had for agricultural education up to the present time. In the first place, in our pioneer days, we had the old county fair. That was really an object lesson. Then after that we got the dairy conventions. I do not need to tell you that these Dairy Associations are schools of agriculture. But you who come to them are those who least need to be educated. It is those people who are not at those Associations that we want to educate Then we have another agency in the way of agricultural education, and that is the Agricultural College. I have often said that the most useful and the most necessary educational institution in the Dominion of Canada to-day is the Ontario Agricultural College at Guelph. It is doing a very great work; it surpasses all the other agencies of which I have spoken. But it only gets at a few; and after all it begins at the top, and does not cover the whole ground. Then, what is our duty? I cannot enlarge to-night upon this work; I want to come directly to the one point that I wish to make here this evening, and it is this: What should we endeavor to improve upon in the way of agricultural education? What should we do that we have not done yet? I maintain we should get as quickly as possible at the boys and girls of this country. That is where we want to begin in any kind of education if we want to advance in the work of agriculture in Canada. The church which gets hold of the children and makes them early acquainted with its doctrines secures these children for all time to that church. The State which teaches the boys and girls from their infancy to love their country, and gives them lessons of patriotism, makes them patriots all their life. And so if we want to see agriculture prosperous in this country, we must get at the boys and girls who belong especially to the farm, and educate them as if they were going to be farmers instead of something else. You know the old saying, "As

the twig is bent so the tree inclines." The same thing is true of children in relation to education. You educate the boys and girls away from the farm and force on them opportunities to learn professions, and they never will stay upon the farm, or go back to the farm after they leave school. But if we took hold of them in their earliest years and endowed their minds with love of the farm we would retain them there. In laying down this proposition I might illustrate it by showing you that agriculture has been taught successfully in schools in other countries. I might refer you to France, which is the most prosperous country in the world to-day, in some respects. They have not only an Agricultural University and Normal Schools, similar to our High Schools, but they have agriculture taught in all the primary and agricultural schools of France, and the result is seen in the extraordinary progress of that country. I would refer you to this object lesson, that while in England only thirty-three per cent. of the people live on the farm, in France seventy five per cent. live on the farm, and only twenty-five per cent. in the towns and cities, and this is largely the effect of primary education. To show you the wealth of the country, these peasant proprietors in France have in the post-office savings bank no less than $600,000,000 on deposit, and France exports now £27,000,000 sterling worth of food products from the farm, while in England, where they don't pursue this system of agricultural education, they import, or bring into the country, $80,000,000 worth of food products. We pride ourselves upon being very progressive. We think we are a great country. We are almost as proud of ourselves as our neighbors across the line, and we think Russia is a country of ignorance, living in the dark ages Would you be surprised if I read you an extract here showing that in Russia they are teaching agriculture in all the public schools, and that they have around these public schools, gardens of flowers and little forests of trees, which the children are taught to cultivate and study, and they are infinitely ahead of this Canada of ours in the matter of popular agricultural education? Probably some of you were not aware of the fact until this moment. I ask you to take it to heart, and see if it not time for us in this country to ask ourselves what is really the object and the end of education.

Now, I am not going to discuss to-night our school system. It is one that we are proud of, and a magnificent system in its way. But I think it can be improved very much. And I am glad to say that the Legislature have been realising in recent years that there is room for improvement, and they have made agriculture one of the optional subjects in the public schools and in the high schools. Still, we neglect some things in the public schools. It is not the fault of the Legislature, but it is because everybody wants a high school or a university at his own door, and because farmers have been directing the minds of their boys away from the farm to the professions, as if to live outside the farm were the only thing in the world worth living for. So I would simply say that the public school system is the system of the people, and you have it in your hands to improve it and see that agriculture is introduced into the schools, not as an optional subject but as an obligatory subject, in every one of the public schools in this country. I am inclined to think we are spending a vast amount of money in this country now, making doctors and lawyers and teachers, and there are a good many of them that we could possibly get on without. I say this country should educate its boys and girls for the farm and for productive pursuits. When I plead for agricultural education in the schools what claim can I put forward? Simply this, that 70 per cent. of the boys and girls are living in the rural districts. Go through the public schools, and you would scarcely know from the lessons taught, and from the general air which prevades the schools you would never know that there is a farm in the country. Now, I think it is time we should change that. I do not expect you to make farmers in the public schools, but you can interest them in an elementary way in the subjects connected with the farm, and in so doing you can improve them just as well as by giving them the "ologies" which lead them to the professions. I would like to know if in improving the mind you cannot do so just as well in drawing attention to the nature of soil and plants, and trees and the growth of trees, the names of trees and the functions that trees perform in the economy of nature. I think in doing that you could improve a child's knowledge, its judgment

and its memory. I think if we had a little more reading matter in our public school books relating to the attractiveness of country life, and the prospects there are on the farm for those who follow it intelligently, some of these boys would get interested and stay upon the farm. I do not see why our geographies should not relate to the distribution of agriculture throughout the country, to the kinds of soil and products of the various parts of the country. We could also improve our histories in this respect. If, for instance, instead of a history of the life of that royal profligate Henry the VIII. and his numerous wives and kindred matter taught in our schools, we taught the history and life work of a man like Harvey Farrington, who gave his life to agriculture, and added millions to the productive wealth of Canada, it would do our boys more good. Somebody has said, "Allow me to make the songs of the people, and I care not who makes the laws." I would parody that by saying that, "Allow me to make the school books of the country, allow me to direct the teachers of the country, and I care not who makes the laws." I say it is the influences of the school that mould the destiny not only of the individual but of the whole country. If you were to take out of the school books of this country and the United States all reference to past wars and struggles between the people of the United States and the people of Great Britain, it would be unnecessary for us to have a treaty of arbitration between the two countries. And if you would go a little further, and in place of these references to the history of the unhappy savagery of the past, where these nations have been thrown against each other in the awful struggle of war, if you would replace that sort of reading with lessons upon the unity of the two countries, upon their kindred origin and their mutual interests, and the necessity for their living together in amity and friendship, I think would perform a great service to the two countries. (Applause.) I believe that the man who would do this, and would give that kindly, human bent to school study and direct the minds of the boys and girls of the United States and Canada, I say he would be as great a patriot as ever lived in the United States, not even excepting Washington or Lincoln. He would be the advance agent of civilization and a friend of the human race. It is in the schools that you should make the future citizens and the future history of the country. For that reason I urge strongly upon the people of Canada to take more interest in the public schools. If you want the farm to prosper, educate the boys and girls in the public schools in its direction, rather than educate them away from the farm in the direction of professional life. Of course we cannot do all this in a day. We must first get the teachers. And, unfortunately, many of the teachers in the public schools to-day are those who are trying to get away from the farm just as fast as they can. I believe we should begin now and induce or force the teachers to study agriculture. If I had my way I would put one-third of the high schools in the charge of Mr. Dryden. I would make them elementary schools of agriculture, that would lead up to the agricultural university, the Ontario Agriculture College. I think it would be a great deal better for this country if something of that sort were done. (Hear, hear.) I am not hopeless that something of that sort will be done very soon. I would also like to see us utilize in the public schools the able and intelligent young men, the flower of the country, who are now going through the Agricultural College. I would like to see the boys who pass the Agricultural College eligible to teach, say, as assistant masters in some of these public schools. It would do infinite good if that were the case. The public school is the school of the country. The State owes it to every boy and girl that they shall get a primary education. I believe in increasing the efficiency and raising the standard of the public school. But when we go beyond the public school it becomes a question of degree how far the State should go or how far the individual should help himself. It is the public schools we are interested in, and that is where we should begin to teach agriculture. The reason many of our boys and girls have left the farm and gone into professions where they are not succeeding well is that you yourself do not fully value the farm, do not realize the dignity of the farm as you should. I have associated with farmers all my life. I know the work you have to do. But taking it all in all I believe to-day the farmers are more prosperous than any other class in this country. You know how it is in the industries of the country; you know how it is in the professions. Men are almost starved in all the

learned professions of the country. You know that statistics show that not five per cent. of business men succeed. But on the farm, although your success has not been so great in the past as you might desire, the proportion who have succeeded is very great indeed.

In conclusion, I ask you in what position in life could you have done better than on the farm? I plead with you all, do not despair of the farm. If you value the lessons that have been taught at this convention, you will have at least a measure of success, and your measure of success will be in exact proportion to the extent to which you use your brains as well as your hands. I want to say to the people of Canada, believe not only in Canada but believe in the farm, and teach your boys to believe in the dignity of labor, not only upon the farm but in the town as well. The future of this country depends above all things upon the farm, upon the prosperity of agriculture; and the future of agriculture depends upon agricultural education, and especially the agricultural education of the young. (Applause.)

## ADDRESS.

By Hon. Sidney Fisher, Dominion Minister of Agriculture.

I can assure you that it gives me great pleasure indeed, to accept the kind invitation which you extended to me through the Secretary of the Western Ontario Dairymen's Association. It has been my misfortune in years past when I received this invitation, on account of other engagements to be unable to attend your annual gatherings. I regret that, because I knew the Western Dairymen's Association was one of those powerful agricultural organizations which has done so much for the industry of which I am myself a member.

Mr. President, I am a politician, and perhaps a keen one. But I must tell you frankly a secret, which is that I rather prefer to come to a dairy and agricultural meeting than to come to a political one. Before I was a politician I was a farmer, and I might call farming my first love. If to-day I occupy the position which I do of Minister of Agriculture for the Dominion of Canada, it is because I am a farmer and not because I am a politician. When Hon. Mr. Laurier was forming his cabinet I happened to know that he made up his mind that the Minister of Agriculture should be a farmer, one who was engaged in the business and one who understood the wants and needs of the men who were engaged in that business, and it was due to the fact that I was and am still engaged in the business of farming that I occupy the position. It is a great satisfaction to me indeed that a farmer has been chosen for this position. I do not arrogate in any way to myself that compliment, but I take it as a compliment to the class in which I belong. As Minister of Agriculture I am charged with looking after the interests of agriculture for the whole Dominion, the educational portion of this great subject is especially in the charge of the Provincial Executive. You know that by arrangement all of our educational matters are entirely within the prerogative of the Provinces, and it would not be wise or prudent for the Dominion Government to interfere. I hope and trust that the scheme that has been laid before you to-night so ably and clearly by Mr. Pattullo may appeal to the people of this Province, and that greater strides and advances will be made than have been made up to the present time. This is essential at the present time, because agriculture has changed. The business of farming is not the old rule of thumb affair that it used to be at the time that they had the rich virgin soil of a new country at their hands. Its conditions have changed, and as the fertility of the soil has been disappearing, the men who are going to till these fields have to be educated in the rules and the sciences which govern the business in which they are occupied. Therefore, it is more necessary that education should be complete in all its branches. This particular branch of the subject is under the control of the Local Legislature. There is a vast field for the Dominion Minister of Agricul-

ture to deal with. I am especially charged with the business of transportation and of trade and commerce in agricultural productions, and I find that at the present time new conditions and new circumstances are pressing on, and that new methods and increased facilities are required by the people. I am glad to know that in this way I will be able with the advice of those engaged in this industry throughout the land, to increase these facilities—to make provisions that these food products for which Canada is famous may be placed in undeteriorated condition upon the markets of the world. It is a great work to engage in. It is indeed an object of fair and noble ambition to accomplish, and I can assure you that in the work which I find comes to my hands, there is abundant scope not only for the expenditure of money, but abundant scope for the most careful thought and planning to accomplish this result.

I venture to lay down this rule, and I think it is one that the people of this country should take up, that when the demands of our people require it, while careful economy is necessary, I believe the great agricultural industry is of vast enough importance in our land to demand what is necessary for the development of that industry, and the trade and commerce in its products. (Applause.) I can tell you frankly that not only my own colleagues, but the House of Parliament, seem to be perfectly willing to grant the sums necessary for the accomplishment of the objects which I have just outlined. I am charged more or less with looking after the interests of agriculture throughout the whole length and breadth of our country. I am especially interested in coming to the Dairymen's Association, because I myself am a dairyman, and for another reason, because I believe dairying is to-day the most important branch of agriculture in our country. (Applause.) I do not say this to flatter you, I say it because I myself am a dairyman, and because I think that I chose that branch of the business because I found it to be the highest development of the business. It is that part of the business in which the highest skill and the greatest training and the best intellect and mental powers were required, and therefore I consider it a branch of business to try and get an opportunity for the ambition which is natural to all young men.

There is another thing which I wish to speak of. At the present time the old system of raising grain, and exporting wheat and oats and barley and such things, are giving place to dairying. People of this country have appreciated the fact that dairying is not only the highest branch of agriculture, which enables the farmer himself to come to the highest development, but at the same time it is also that branch of the industry in which the soil fertility of the country can be best maintained, it is that branch of the industry in which stock keeping can be carried to the utmost perfection; and we all know that underlying our whole industry is the principle that we must keep stock upon our land and feed our crops to that stock as an absolute necessity in the present conditions of agriculture in our country. At the same time I must not forget that while our great Province of Ontario is a great and a rich Province, and has led the way in all these industries, yet there are other Provinces to aid, and for the past few years back the Department of Agriculture has been aiding and assisting in the Province of Prince Edward Island in the dairy industry, and have succeeded in developing a dairy industry there, which did not exist a few years back. In any other part of the country where the dairy interest does not exist we must aid and assist it and try and place it upon a firm basis. It was for this reason that last year I came to the House and asked that I should be given such a subsidy as was necessary to develop the dairy industry of the North-west. At the present time, with Prof. Robertson's assistance and aid, I am looking for the development of the dairy industry in the North-west. I want to tell you of something that occurred last summer. There was a shipment of butter made from Prince Albert, a place about seventeen hundred miles north-west of Montreal, which was put in cold storage at a creamery there, and taken from that creamery in a refrigerator car to Montreal and sent across to the English market in cold storage. It realized a price of 114 s. per cwt., a price that was excelled in the English market by the very best quality of Danish butter by only 2 s. per cwt. This is a fact which leads us to the greatest encouragement for the North-west. I believe most emphatically that the way in which the great North-west can best be developed is by establishing there the dairy

industry, and not be any longer dependent entirely upon the exporting of wheat. What we want up there is people, and we know very well that a greater number of people can be kept on the same amount of land in the dairy business than in growing wheat. While to-day the cheese market is almost full of Canadian cheese, the butter market is not by any means crowded by Canadian butter, and there is abundant opportunity not only for these eastern Provinces to produce butter, but there would be no diminution of the butter trade in England for us if the whole North-west Territory was producing butter; and I am satisfied that in the development of that country the best thing we can do is to encourage the establishment of creameries, and bring about an improvement in the settlement of that country. In British Columbia there is a tremendous mining development going on. We hope and believe that in the immediate future there will be in that country a very large number of people who will be dependent upon our country for their food supply. British Columbia, although considerably mountainous, still has areas of splendid rich land in the valleys, and that part of the country may be used for agricultural purposes. I find abundant scope for work there, and I am satisfied that in anything I can do to aid in the accomplishment of that great industry the people of this country will back me up and support me. I will just say one word with regard to my native Province of Quebec. I am glad to see here at this Convention the President and Secretary of our Dairy Association of the Province of Quebec. I want to congratulate Mr. McDonald upon this new step, because I think it is the first time the President of the Quebec Dairy Association has penetrated so far west. I am sure he will go back with a new inspiration to double the dairy industry in that Province. In the Province of Quebec there is a tremendous dairy development, and while you in Ontario have taken the lead in cheese the Province of Quebec has been more largely turning its attention to butter. With the rich milk of French-Canadian cows, and with the rich pastures that is there the year round, even in the hottest part of the summer, we have splendid sweet herbage which is good for the production of butter the year round. I believe to day there are twice as many butter factories in Quebec as there are in Ontario, and I am glad to know that the butter trade has attained a high reputation, and that cheese has improved in quality, and has run a little hard your best Ontario cheese. This may be a subject of congratulation to you as well as to us. I can assure you that the people of the Province of Quebec have been looking with pride upon the progress which the people of Ontario have made. We have looked to you for guidance and assistance, and you have given us all that with generosity. I am sure that the prosperity of one Province is a measure of prosperity of the whole; we can only so prosper together. This great Dominion which stretches from ocean to ocean is made up of different Provinces that are drawn together by nationality and unity which must exist if we are going to make a solid country, and a solid nation. I am glad to be able to come among the people of Ontario more than I have in the past—to come and ask for your assistance and aid in the work about which I am going to ask your advice—for it is only by the aid and advice of the great mass of farmers in Ontario that I can improve and make more prosperous the industry which they are following. I wish once more before sitting down to thank you for this opportunity of addressing you, and trusting this meeting will be one of the many which have been so successful on the part of the Western Dairymen's Association. (Applause.)

The CHAIRMAN: I voice the sentiments of every one here when I say we are glad to have the Minister of Agriculture here to-night. He is pleased to meet the people of Ontario, and I am sure we are delighted to see him.

## THE CHEESE BRANDING BILL.

By Hon. Thomas Ballantyne, Stratford.

I have been asked to open a discussion on what is known as the Cheese Branding Bill, as introduced last session by the Honorable the Minister of Agriculture. Similar bills have on previous occasions been introduced, but have never become law. The first was by the honorable member for Glengarry, as a result of the Home & Foreign Produce Exchange, London, and other bodies passing resolutions asking that a law might be passed compelling cheese factories to brand the month and the day of the month on their cheese to prevent dissatisfaction and commercial dishonesty, which in their opinion was being practiced by shippers on this side. Circulars from the committee of the House of Commons were forwarded to every factory and every person engaged in the business, asking the opinion of those interested, so that the Government might learn to what extent the people of this country were opposed to or in favor of the Bill. I believe the circulars that were first sent out were very largely answered, and that an overwhelming proportion of the answers were in favor of compulsory branding; as to the second set of circulars I am not posted, but have no doubt they will be answered much in the same manner as the first set. I myself am strongly in favor of some such Bill, and that the dating of cheese should be compulsory; the day of the month and the month of manufacture should be put upon the cheese itself immediately after the cheese are taken out of the hoops, or within a day or so of this time. The bill might be made to read that "the cheese shall be branded with the day and the month of manufacture within two days from the date of manufacture," and this would cover this point. Because of the moulding of cheese in many of our factories it would be very difficult for the factory men to reproduce these dates correctly upon the box, but there would not be any difficulty in putting the month of manufacture upon the box, and if the month of manufacture only were upon the box I think it should answer the intention of the Act. In the Bill that has been prepared it is provided that each factory shall have a number to represent the make of the factory, and that it shall be compulsory upon the factory to put this number upon the cheese and upon the box. To this part of the Bill I am very strongly opposed. I believe it would not do otherwise than work great injury to many factories whose cheese are now in demand, and who have gained a reputation for themselves by reason of their care in sending only finest cheese under their factory brand. I do not know a factory in the country where all the cheese have been such as they would wish to put a factory brand upon, or the number of the factory, which in this case would represent the factory brand; for, if the factory brand were upon all the inferior cheese as well as upon all the finest cheese, the good name of the factory would undoubtedly be injured. It is no disparagement of anyone to say that all factories at times have poor cheese; for the makers have not always control over all the conditions that go to make finest cheese. The weather is frequently so very unfavorable, cattle may have been allowed to drink stagnant water, or other conditions which go to produce an inferior article may have existed without any knowledge of the cheesemaker, or without him being responsible in any degree. If these inferior cheese are to be branded the same as the others the factory's reputation must suffer; but if he may use his own good judgment and put his factory brand upon those only which are finest and sell the others at their value, for what they are, without any factory brand, I think good would result to factories doing this. I have in my mind's eye during the past season one or two of the very finest factories, yet during certain months, in consequence of bad water, some of their cheese were almost unsaleable, and they happened also to be white, and consequently there is no market for home consumption. Now if these had to put the number of the factory on their cheese you can imagine the serious injury that would be done to these factories. The retailer who got cheese with that number on would never again want to buy any from that factory. He would say, "No more number 6 for me." All that is necessary is merely the country, the month and the day of the month.

This agitation on the part of Englishmen arose because of the difficulty they have had in their importations from this side. They complain that they buy June cheese, and that cheese of the make of other months are tendered to them upon their contracts, and that it is only by exercising the greatest vigilance that they can defend themselves against fraud on this account. They buy September's and the make of the month of August or of the month of October is shipped to them, and it is quite a common expression in England to hear the importer remark, "There seemed to be nothing but June and September cheese made on your side this season." This is the reason for asking for this Bill from their standpoint; but there is still further reason from your standpoint. It has become customary for some time past to offer cheese months before they could be bought, sometimes with the object of doing a legitimate business, but more frequently for the purpose of depressing the market to a point where these cheese would probably be cheap at the time they came upon the market. It has been customary for these speculators to offer June cheese in England during the winter months preceding the month of manufacture, and continue from then until the time of manufacture; each speculator apparently vieing with each other to see how cheap they could offer and to effect as few sales as possible, and all with the one common object, of getting the price of summer cheese low enough to make them profitable to the people engaged in the trade. Now you must see if they succeed in depressing the market beyond a normal condition, that while they make money they do so at the factorymen's expense, and what applies to June cheese also applies to the make of the month of September. When we have got past the time for selling June cheese short, the same speculators begin selling September cheese short, and we frequently find shippers on this side holding the make of the month of August in the factories until the month of October. For what reason, do you suppose, but to hold them long enough to make it appear that they are the make of the month of September. Now if these dealers buy May cheese and sell them to an importer as June's, does it do credit to our Canadian exporting business? If he sells August cheese as September's, and ships them as September's, does it not do great injury to the make of the month of September? I remember being in the office of an importer one morning in the month of September, when an offer was made to them of August cheese, at least four shillings per cwt. below what they could be bought for on this side. I immediately cabled my son regarding quotations, and found there were no such prices for August cheese; no August cheese could be bought at any such price. I have no doubt—none whatever—that these cheese were July cheese, and if sold would have been delivered as August cheese. You can therefore see the injury that is done to the August month; the difficulty in getting the price they otherwise would get, in consequence of these offers and sales. We frequently find when these operations are going on that it is not possible to compete with the men who pursue this kind of business, but we feel that we know what is going on just as well, and sometimes appear to great disadvantage as compared with others who were quoting prices from our own section. We frequently find our competitors offering September cheese before it is possible to buy the make of this month; we find them offering the September's at shillings less than it would be possible to buy a single box at the time they were offering them, and at the same time they were buying Augusts and holding them until the month of October before shipment was made. We naturally concluded these Augusts were being sold as September's and being shipped as such. This, as you will see, would have the effect of depressing the market for September cheese as well as deceiving the importer. Of course, as you are aware, buyers on this side take good care to buy the half month or the whole month, but the dating of their purchase being invariably fixed; and I assume the correspondence generally is on the same line, offering half a month, the whole month or two months as the case may be, but the dating of the offers is always included; at all events that is my own experience without a single exception. Surely it is to the interest of everyone to maintain commercial honor and prevent as far as possible commercial dishonesty, and I feel personally anxious that this Bill should become law, so that we might have fair and honest competition. I feel anxious that this Bill should become law, that the good name of our Canadian products should continue. We can never expect to get the confidence of the Englishman unless we treat him honestly, and if we treat him honestly we think it will pay.

An example of this kind is to be found with our neighbors across the line. They have been making filled cheese, oleomargarine cheese, half skims and whole skims, until the very name of United States cheese is enough to prevent an Englishman from dealing in them at all. I think we can take a lesson from them; what has been their experience may be our experience, if we continue the misrepresentation that has been going on for years. No man who wishes to do an honest business can object to compulsory branding. If he sells his cheese now for what they are, it will not affect him when this Bill becomes law, if he does not sell them for what they are he should be compelled to do so.

I cannot see what can be said in opposition to compulsory dating, unless it is that it is a good thing to carry on this system of deception, and I can scarcely imagine anyone taking that ground. I believe it is true there are importers who are anxious that this Bill should not become law, but they can only be anxious that the Bill should not become law for one reason —that is, of carrying on this business of deception themselves; and we have nothing to gain from this, but have everything to lose. If the business is to grow and prosper, it can only be done upon the strictest line of honesty and fair dealing.

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## DEPARTMENT OF AGRICULTURE.

### Agricultural and Dairy Commissioner's Branch.

Ottawa, 26th October, 1896.

I am directed by the Minister of Agriculture to state that an Act to amend *The Dairy Products Act, 1893*, was introduced by him into the House of Commons during the late session. It deals with the branding or marking of cheese and butter and the registration of cheese factories and creameries. It was prepared in the form of an Act in order to give those who are directly interested in the matters with which it deals an opportunity to discuss it before the next session of Parliament.

The agitation for the branding of the date of manufacture on cheese began in Great Britain in the autumn and winter of 1894-5. Circulars were addressed "To the producers of Canadian cheese" from the Home & Foreign Produce Exchange Ltd., London, England, and from some other exchanges in Great Britain. These circulars stated that "there has been considerable dissatisfaction among the cheese distributors on this side of the Atlantic, as to the course of the business during the last two or three years, especially as to buyers who in many cases alleged that they did not receive the special month's make they had contracted for, which called for frequent arbitration during the season just closed.

"The result has been to injure the good reputation of the Canadian product, and to destroy that confidence in dealing which is essential between seller and buyer.

"As the result of a conference representing a great majority of the trade in Great Britain, suggestions have been made to your Government as to the desirability of an Act making it compulsory to brand the date at the time of manufacture upon each cheese. It is fully believed that such protection will be a decided advantage to the factorymen and to the distributors throughout the United Kingdom, as it will at once restore confidence on this side, and effectually prevent any speculative or unscrupulous shipper covering his transactions by substituting one month's make for another. It is earnestly hoped that the factorymen throughout the Dominion will at once commence dating their cheese, especially as the desire is pretty general among the importers to favor those factories adopting this system."

The above quotation is from the circular sent out from Great Britain; and the agitation was made stronger by indefinite rumors and reports in the newspapers, hinting that misrepresentation of the dates of manufacture of Canadian cheese was practised extensively.

I am of opinion that the charges that the make of one month had been sold as, shipped for, or substituted for the make of another month were almost wholly without foundation. It has been our practice, and should be our continued policy and practice as Canadian dairymen, to retain the confidence of the merchants and consumers who buy our cheese and butter by fair and straightforward dealing.

Although a special law dealing with the branding of cheese may seem to some of those who are engaged in the trade to be unnecessary, it is highly important that the request of the merchants in Great Britain, who import and handle our dairy products, should be complied with, if not in any degree against the interests of the producers of cheese and butter in Canada.

On the 25th of March, 1896, circulars were sent to about 2,000 representative dairymen, principally presidents, secretaries and salesmen of cheese factories and creameries.

In reply to the question, "Are you in favor of a law making it compulsory to brand the date of manufacture on cheese?," 544 replies said "Yes"; 63 replies said "No."

I enclose a copy of the Act introduced by Hon. Mr. Fisher, upon which it is desired to have an expression of opinion from you.

Section 4, subsections 1 and 2 are the same as they are in *The Dairy Products Act* of 1893.

Subsection 3 prohibits misrepresentation of dates with intent to defraud.

Subsections 4 and 5 provide for the issuing of a registered number for every cheese factory and creamery, in order that the products of each factory may be traced back to the factory where they were manufactured, and that each factory may thus gain whatever advantage may be in the reputation won by the quality and appearance of the goods made at it and bearing its own registered number.

In cases where one owner has several factories, they may be registered under the name of the "combination," with the name of the combination, and a different number for each factory, as "Allangrove, No. 1," "Allangrove No. 2."

In cases of some factories where a few culls and inferior cheese may be made during the year, they may be branded "Seconds," in addition to the registration number, which would make the reputation of the factory, under its registration number only, more valuable.

Subsection 6 does not require the day of the month to be branded on the box or package which contains the cheese; it requires the name of the month only, as it might not be practicable in cases of broken boxes and in boxing the cheese, to determine the exact date of the month on which any particular cheese was made.

In case the Act becomes law it is proposed that one brand shall be supplied for each factory when the certificate of registration is issued, at not more than the cost price of the brand.

The brand may be of the following form:

Please answer the questions on the enclosed sheet, and return it in the envelope also enclosed, at your early convenience.

JAS. W. ROBERTSON,
Agricultural and Dairy Commissioner.

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PLEASE ANSWER THE QUESTIONS AND RETURN THIS SHEET AT YOUR EARLIEST CONVENIENCE TO

THE AGRICULTURAL AND DAIRY COMMISSIONER,

OTTAWA, ONTARIO.

*Subsection 4:*

1. Are you in favor of the registration of cheese factories and creameries?

*Subsection 6:*

2. Are you in favor of the brand "Canadian" on cheese?

3. Are you in favor of branding the date of manufacture on cheese?

4. Are you in favor of branding the date of manufacture on butter?

Please answer these questions by a simple "yes" or "no"; and if you desire to offer any opinion on, or amendments to the Act, please state underneath the name of the subsection of the Bill to which they are intended to apply.

Remarks: Name. Address.

Are you the patron of a cheese or butter factory?

Are you the owner of a cheese or butter factory?

Are you the salesman of a cheese or butter factory?

Are you secretary or president of a cheese or butter factory?

Do you represent any Association or Company connected with dairying?

If so, please state the name of the Company or Association, and the capacity in which you represent it.

A MEMBER: Are these Englishmen good judges of cheese?

The CHAIRMAN: They are supposed to be.

A MEMBER: Cannot they tell a July cheese from a June?

The CHAIRMAN: That is a very hard question; I would not like to attempt that myself.

Mr. RILEY: I would like to say that some of the facts that Mr. Ballantyne has read to us to-night are ancient history as far as the request from England is concerned. I believe the report he read is about three years old; since then I do not know as there has been any request from the English trade. I have not heard of any request from the trade in England for branding either publicly or privately. I think the circular Mr. Ballantyne read to-night was occasioned by some vendors selling summer cheese for September contracts, but I understand that in the spring following that the parties who bought this cheese had contracts for September cheese, and they did not have to take the June cheese for the September contract. The parties who sold September cheese, submitted to arbitration and paid the difference, and I cannot find anybody in London who would name anybody who sold cheese in that way and did not settle for the difference. I do not think such a law if put on the statute books would benefit the producers. I would say the last time that this Bill was discussed at the cheese market of this city (only about two months ago), it was voted down as being against the interest of the trade; and I noticed the other day at Brockville, that Mr. Ayer, one of our most successful cheese and butter shippers, a man who stands at the head of the trade there, said that he would only tell the producers, that he never knew any instance in trade where cheese or butter with the dates on, sold for any more money than the same products without the dates, but he did know a great many cases where the goods had sold for a great deal less money, and even that the goods had been rejected. As far as the trade is concerned, I do not know, although I do quite a little export trading, what my customers in England really want, I have no request from any one of them saying they want the goods dated, and if they do not say they want them dated I take it that they are perfectly satisfied to trust to the people here, to treat them honestly and give them what they buy. (Applause.)

The CHAIRMAN: I think we have worked up our cheese trade better than any other product of the Canadian farm, to a very high pitch. We now supply about fifty-five per cent. of the cheese imported by England, and I would be very slow to interfere very much with the trade, although there might be some improvement made. I think it is perfectly safe to leave the matter in Mr. Fisher's hands; what he does he will do to the very best interests of the trade. I have that much faith in Mr. Fisher and Prof. Robertson.

## THE NATION'S BREAD AND BUTTER.

By Prof. Robertson, Agricultural and Dairy Commissioner, Ottawa.

Before I speak upon the subject I am going to take to night, I will just add a few words of explanation of what has been called the "Branding Bill." I am not here to express any opinion for or against the Bill, but merely to elaborate for you a few points. The Bill itself is prepared mainly to excite discussion and to obtain information. It contains four main provisions. Circulars were sent to a great many of the representatives of factories all over Canada, asking for answers to four questions. We are still receiving answers.

The first question was: "Are you in favor of registration of cheese factories and creameries?" To that inquiry in the Province of Ontario, 215 said "yes," and 16 said "no."

"Are you in favor of branding "Canadian" on cheese?" To that inquiry 279 said "yes," and 5 said "no."

"Are you in favor of putting the date of the manufacture on cheese?" To the inquiry 235 said "yes," and 48 "no."

These answers all came about the month of September from salesmen or the owners or secretaries of cheese factories.

Taking the whole Dominion the same three questions: "Are you in favor of the registration of cheese factories and creameries?" 436 said "yes," and 50 said "no."

"Are you in favor of branding "Canadian" on cheese?" 541 said "yes," and 10 "no."

"Are you in favor of branding the date of manufacture on cheese? 475 said "yes," and 72 "no."

That is the expression of opinion received in reply to that circular.

Branding will have a use in being descriptive of quality, and if the branding does not do that, I think a brand is worse than useless. Besides being descriptive of quality, it might designate a market name. While June cheese may not define a quality of cheese, it may define a class of cheese for market quotation prices. It is for you to consider whether the date in that sense would be useful and not in any sense harmful. The quality of cheese follows the weather and the pasture and the water condition, and does not follow the calendar; because any man who has been in the cheese trade knows he sometimes gets as good cheese in June as in the other months.

I have no hesitation in saying that legislation should be emphatic and clear to prevent all fraud and misrepresentation If branding being compulsory would make a factory accept the responsibility for any poor cheese made in it, is it not better that factory should have the responsibility than that they should shunt it off on the country at large? If they make a poor cheese they should brand it as a poor cheese of their own make. If the factory make can be recognized, that will excite in others a desire to turn out the best goods. The difference in the English market is four cents between makes of cheese. If that difference exists, and if that difference can be made in the price of cheese over here, it would make the factories desire to turn out a better quality of cheese.

The selling of futures of any form of produce, the selling of anything a man himself does not own, is a damage to the producer and the consumer alike, and if Parliament assembled is not quite equal to managing that state of affairs they are more helpless than I think they are Why should we consider ourselves helpless because commercial men say, "hands off?" I would put a man in jail who would sell goods he did not own, as a warning to other men not to do that, and then we would have less of it. (Applause.) If a man sells goods that he owns and makes delivery, he is all right.

What I am down to say a little on to-night is "The Nation's Bread and Butter." What the nation, like the man, earns for itself by the honest labor of its people—when a man exerts himself to do anything in an honorable calling—he is said to be earning his bread and butter, which includes his food and clothes and house-rent and all the rest of the thing he pays for. Now, if a man does not earn his bread and butter, he must either have it given to him as a gift, or steal it, as our forefathers nearly all did, honest, good people too, as they were. You remember the old story of the man who asked the Scotchman how he was living. He said they were living partly on fish, but mostly on strangers.

It is worth while examining as to whether we earn all our bread and butter. In every competition during all these years when men have been doing the best they could for themselves, the best fed man has had a big advantage over his competitors. Nearly all the wars of the world have been won by the best fed armies. We ought to look after the bread and butter on our farms, and see that we eat the best bread and butter.

Let me tell you why the city people get ahead of farmer folks, because they are better fed. A man's mind is better and cleaner and keener when a man's body is well nourished. The farmers sell too much of their best products. Cheese is worth more to the farmer than bacon, ten times over. There are too many homes that I have gone into that for breakfast have potatoes and fat pork. I would not like to make a speech on a diet like that. It does not nourish the part of the man who wants to do keen thinking. A well-fed man has an advantage. A man who is educated is a strong man, because his mind is trained to be used in the best way for his country and the good of his fellows. Now, then, is Canada in that sense making sure of its bread and butter? Do our boys now know equally as well how to make the most of Canada's resources as they knew twenty-five years ago? I am not quite sure of it. Men could then fell trees and build roads and bridges a little more successfully than the farmers and their boys can now. These men were trained for that class of labor, and our boys have often been trained for other classes of labor.

The only sure way to increase the wealth of a nation is to increase the amount of farm products and other products in factories or on fields, or from mines or in the woods. It can be borrowed otherwise, it cannot be made otherwise. Our bread and butter is always improved and increased by intelligent labor.

Another thing is to make these things that are produced worth more. That is, perhaps, the main service that the cold storage system will have for the farmers of Canada. A man may labor ever so hard to get his goods of the very best possible composition. But composition is not half so important as the condition. You may have cheese composed of milk with five per cent. fat, and if it is off flavor nobody wants to buy it except at a reduced price.

This Association, and all other associations that do a like work, have helped very much to improve the condition of the people of this country. I will spend just a few moments trying to illustrate this by speaking of what bread itself comes from. You may have wheat, but unless the wheat is of good strain, and unless it is quickened by some external energy like heat it never gives you a wheat crop, and you can never get any bread. You might stick all the fertilizers you could on the outside of the wheat and not improve its worth, but if you waken it up to its influences that wheat will send its roots down and leaves up and gather influences for your service.

So when the farmer or cheese-maker comes here he goes away better if he goes with a quickened mind. Men go home from these conventions all over the country, and do more for themselves than they otherwise would. In Canada we have excellent chances for the best bread and butter conditions. Flour from our wheat makes the strongest bread in the world; that is indisputable. It will make more bread and better bread than the flour from any wheat grown anywhere else; that is why flour from Manitoba sells for the highest price. We have a climate for producing the

most excellent cereals, and equally well adapted for giving us the mildest flavor in other fine foods. We have a climate that because of the pure atmosphere of summer and the cold atmosphere of the winter enables us to make butter that is mild. We have been trying to send England weak wheat and strong butter, and they want strong wheat and mild butter.

We make in Canada now no less than 75,000,000 pounds of butter; a heap of it last summer sold for eight cents a pound, and most of it for ten cents a pound. A little creamery butter sold for seventeen, eighteen and nineteen cents a pound. The loss on strong butter last year was so great that it would have paid for all the creameries and half the cheese factories in the country, because we persisted in making strong butter which people did not want to pay a strong price for. The British market is a large importer of fine butter. Last year we got for the best butter we sent out of the country twenty-five cents on the dollar less than the Danish people got for the same quality of butter. I tell you it is pretty hard for one man to keep on competing against a neighbor if he gets paid always only seventy-five cents on the dollar. Our competitors have been training their young men and girls to make the finest of fine butter for the English market, and by a little bit of careful work we can improve our conditions in this respect.

It took Denmark just twenty years to develop their butter trade, and now it is a pretty good trade. They practice co-operative methods, by which people learn to make butter and market the butter. They have a peculiar way of marketing butter, so that the Danish buyer does not go over to England once a year and come back and tell all over Denmark that butter is going to be cheap in two months. We have been treated to that kind of gospel in Canada for two years. Eight years ago Denmark sent hogs to Germany and Germany said : "You have diseases, we do not want your hogs any more," and instead of Denmark sending 200,000 they just sent 20,000. The next year they thought they would make their own hogs into bacon and send them to England themselves, and the farmers organized a joint stock company and drew their hogs to their own curing factory, and in eight years there grew up a business of £10,000,000, or two-thirds as much as our cheese trade, and this in a little kingdom with a people not so numerous as the people of the Province of Ontario.

There is always risk in all kinds of educational helps, and I have no hesitation in saying our universities are places where men are spoilt dozens of times—the man's native energy is lost while his judgment is being improved. Now I think I would rather have a man for our country who has a full and masterful energy, than a man who is full of acquired judgment if he was entirely permeated with the original sin of laziness. Education is just good as far as it brightens a man's judgment and leaves his energy unimpaired.

France has been quoted as an exceedingly wealthy country, but the kingdom of Denmark, that was amongst the poorest of nations fifteen years ago, stands ahead of France, and stands next to England herself, and if the present rate of progress goes on she will be ahead, and this not by its growing and manufacturing concerns, or its climate, but by the most material and persistent labor of the people.

I believe if we look after these plain bread and butter conditions in our land, we will improve our conditions. How much better would Canada be if she had got thirteen cents a pound instead of nine cents a pound for our cheese for the last ten years. Would not that have been booming times? If we had improved our bacon trade as the Danes have done we would have made more wealth than the difference in price I have mentioned.

To show you another instance where practical help in this way of stimulating the people has given best results, allow me to make a little illustration from my own country. Taking the wealth of the sea as being equal around the shore of the west coast of Scotland and the north and west coast of Ireland, the Irish fisheries are considered better than the Scotch. There are 22,000 men employed. In the one case getting out of the same sea $57 per head, and in the other, with more rigorous conditions getting out of the same sea $187 per head, men and boys.

They have better nets and better boats, and more information as to where to put these nets and how to set them ; $57 against $187 by looking after bread and butter conditions and making the most of them. There is no limit to the wealth of this country by the intelligent labor of its people.

Marketing products, like other things, depends not merely on the quality but on the man being able to discuss skilfully his own business. I think those who know me best know that I do not attach very much importance to mere expression in speech ; but if one goes to sell anything to one who wants to buy, the price is determined by his skill in talking his product up, and every man's skill in buying is to talk the other man's product up a little but to talk his conscience down. Farmers need to have all these things discussed. There is one thing most hopeful in this country, and that is that the papers discuss everything. Farmers' Institutes and all these gatherings discuss these things.

The people of Quebec have no unkind jealously against the people of this Province when they make a little progress, any more than we have against them if they make progress. It is a good thing to forget one's own farm fence and believe in the vastness of this Dominion and the bigness of this Empire, which has given thousands of people opportunity to eat their bread and butter in peace, and I hope the dairyman will help in keeping up that state of affairs and make this Canada of ours the wealthiest and most prosperous country in the world. (Applause).

## COMMON SENSE IN DAIRY MATTERS.

By Ex-Governor Hoard, Fort Atkinson, Wis.

We have listened to-night to some very inspiring and cheering talk. I am considerably more of a man than I was when I sat down, and if you have not grown in your stature, it is because you are too thickly planted down there. Now I like to consider, that at the bottom of everything in this world there is a system of ethics. The men who have plowed themselves most profoundly into the conviction of their fellows, have been men who have believed in the right and wrong of things. There is the ethical basis. The immortal Lincoln was a man who was first ethical and then worshipful. Reverse the operation, and you have a man who is first worshipful and then ethical, and you have a bigot and a fanatic. A man who is first ethical and then worshipful is a reasoner, and from the domain of reason most all things come.

Now this injunction to take a broad view of things, to look upon mankind as fellows, not as enemies, finds splendid illustration in the little fable of Æsop's on the two men that were journeying along the road on a cold winter day and they discovered a man by the side of the road, one who was perishing from the cold. One of the men said : "We must stop and warm that man into life." They were both of them nearly perishing themselves. The other man, taking a narrow view of the thing, said : "No, we must push on or we will both die." The first man said, "No." He jumped out of the sleigh and proceeded to warm and work with the man, until he had finally warmed him into life, and, lo, and behold, by his own effort, he had warmed himself, while his former companion was most frozen to death, as the hog deserved to be. In giving, we most largely receive. A great many people at the start in life deceive themselves as to the quality of their logic as well as to the quality of their mercy.

One of the most beneficent propositions in every man's life is common sense. Now common sense is what I spent a week once in striving mightily to define, and I got this far : Common sense is the widest understanding possible of the relation of common things and your relation thereto ; surrounding me and you everywhere are common things and uncommon things are mighty uncommon. There is between the cheese made here and the mouth of the consumer across the water one constant succession of common links, plain, common links that makes a tremendous proposition for the apprehension of any man. Like the grains of sand that make a continent, but all the same the commonest kind of

material put together, so that all there is to statesmanship, and all there is to to the highest attempt of human intellect to apprehend any proposition, is simply the capacity to enclose the whole range of common things. Men are common men and women are common women, and God spare us from a very large percentage of uncommon ones of either sex. I have noticed this in my life, that if ever I succeed in getting anything like an adequate reward, I must give to the court my very best testimony. What is the secret of my human endeavor? Raphael, the great painter, was once asked to define Art, and he spent a week in studying it, and he finally reduced it to this proposition, "All there is of Art is the ability to see. If a man's eye cannot see the picture, the hand will never paint it." I told last night of the Irishman that dug me a ditch who was an artist in the forming of that ditch. There is art in the breeding of a Jersey cow, and it is so in every proposition in life, the ability to see; and just in proportion as men quicken their observation, their ability and power to see, so do men as a rule avail that eye sight to the final fruition of their hope. These things are based upon common sense—hard, practical, common sense and human industry. Abraham Lincoln told this story: Once when he was canvassing Illinois for the United States senatorship of that State, he was discussing the attempt of the Democratic party to ride into power upon the pro-slavery cry, and I think often how well it applied to men in other things—to the man who embarks his fortune with the poor cow, or with the fisherman on the coast of Ireland who embarks his fortune with poor endeavor, or in Canada or anywhere else. The story Lincoln told was in the early history of Illinois. A Methodist circuit rider came to a country cross-road, and there stood a typical country boy with a ragged hat, a neglected pair of breeches, bare feet and one suspender. The minister was mounted on the worst horse that had ever been seen in those parts; absolutely looked as though it needed to lean up against something, and the minister says to the boy: "Which of these two roads will lead me to Bloomington?" The boy paid no attention to the inquiry; he was in contemplation of that horse. He had a country boy's keen eye for a horse, and he could not think why any man on the earth should ride such a horse. Finally the minister repeated the question, "Which of the two roads will take me to Bloomington?" and the boy woke up and he said, "Who are you?" He said, "I am a follower of the Lord." "You are, well sir, it don't make any difference which road you take, you will never catch him with that horse." You know there is such a thing as robbing Peter to pay Paul. You know men satisfy their conscience sometimes in a way that is not equitable, ethical or reasonable and men are not honest. I know thousands of men who are not honest with their cows, they are not honest with their family, they are not honest with themselves. They will take the oats from the horse that is plowing, and flatter themselves that they have made money on this reduction of oats.

After another humorous story, the speaker concluded.

## PRACTICAL BUTTER MAKING.

By J. B. Muir, Avonbank.

The work of practical butter-making commences when the milk has been received at the creamery, although the condition of the cows, care of utensils, cleanliness in milking and the care the milk has or has not received, has, to a great extent, determined results before the milk arrives at the creamery.

Tempering the milk for separating is the first step after the milk has been received. The most thorough skimming will be done during the winter season by separating at a temperature of about 90°. This can be best accomplished by heating the milk in the receiving-vat to 65° or 70°, and finishing in a channel tempering-vat.

When the first milk has been received, I would turn the steam on the receiving-vat, start the separators, (having them previously oiled and the bowls filled with water) and the pump that elevates the milk to the tempering vat; then by the time the separators

come to full speed, the tempering vat is filled and the milk raised to the desired temperature, ready to let flow into the separators. Give the separator close attention and see that full speed is maintained until the separating is finished, so that there will be no loss of butter fat. After the milk is all through, flush out the bowl two or three times with warm water to remove all the cream.

I would recommend every butter-maker to test the skim milk every day. Have a bottle and catch a sample every fifteen or twenty minutes during the run, then take a sample from that for the tester. It will not pay any creamery to run a separator that that will not skim to a trace every day.

*Use a Starter.* I would always recommend the use of a good, clean flavored starter for ripening the cream, and would put it in early so that the flavor will become fixed in the cream before any undesirable bacteria develop.

The best and safest starter to use is made from fresh sweet skim milk. The objection to using buttermilk or sour cream is that if you get off on flavor, you propagate it from day to day.

Ripening the cream is the most important part in the manufacture of fine butter, yet this point is often neglected and left to be done in a "happy-go-lucky" manner. If cream is left alone to ripen spontaneously, a chance is given to all kinds of bacteria to develop, and the result depends upon the "survival of the fittest," so that I am satisfied more uniform results may be obtained in all cases by the use of a properly prepared starter. I would recommend using plenty of starter, from six to ten per cent. and ripening at a temperature high enough to ensure the cream becoming sour before evening; then cool to 60° or below as quickly as possible, and by leaving cold water or ice around it, it will be down to about right churning temperature in the morning. This I consider to be from 50° to 53°. Some may think this is a very low temperature, but there are many advantages in churning at a low temperature. It not only gives more exhaustive churning, but it gives better butter, with less foreign elements in it, with much better keeping qualities. It is necessary to have rich cream, or cream containing from thirty to thirty-five per cent. of butter fat to enable us to churn at this low temperature, as thin cream cannot be churned below 60° without exhausting a great deal of time and patience. Thin cream also develops acid much faster than rich cream. This is another point in favor of rich cream, as we are better able to control the flavor and ripening process by having cream with a small quantity of milk in it, and introducing a good pure starter. Cream ripened at a high temperature should be cooled to about 50 or 52 degrees about two hours before churning, to solidify or harden the fat. So that the practice I have recommended of ripening and cooling the night before, will be found very convenient, as the cream is ready for the churn first thing in the morning. Cream should always be strained into the churn, to remove any lumps of cream or coagulated casein. If color is to be added, do so after the cream is in and before starting the churn; about one-half an ounce to 1,000 lbs. of milk will give about the right color at this season of the year. But this amount will have to be varied according to the season of the year and the market the butter is intended for. No color should be used for the English market.

The churn should never be filled over half full, one-third is better, especially with thick cream at a low temperature, as it is liable to foam and fill the churn, so that concussion ceases. When the butter begins to come, it is a good precaution then to take the temperature, and if found to be too high, to cool a little by adding some ice cold water; if the temperature is not too high, sufficient cool water need only be added to keep the butter in granular form until the butter is gathered to about the size of wheat grains, or a little larger. The churning should never be done in less than forty-five minutes; from that to an hour will be found about right. Every butter-maker should test his buttermilk daily, and if he is losing more than a trace of fat, there is something wrong, which should be looked after at once.

*Washing the Butter.* Washing butter is for the purpose of removing the buttermilk, and the least washing possible that will accomplish this is to be recommended, as too much washing does not give as high a flavored butter as once washing. This is another

advantage of churning at a low temperature; it requires less washing to remove the buttermilk. The quantity of water used should be equal so the quantity of cream churned, and should be at a temperature of about 55° during the winter season. The best way to heat the water to this temperature is to have a small steam pipe connected with the water pipe at the churn, and then steam can be turned on and the water heated to the desired temperature. After the water is added, revolve the churn for about two minutes, and draw the water off immediately, as it affects the flavor if left on the butter.

When the butter has drained for fifteen or twenty minutes, it may be salted either in the churn or on the worker. The former method I believe to be the better one, as there is no better place to incorporate the salt with the granular butter than in the churn. An even color is more easily obtained, and the texture of the butter is preserved in consequence of less working being necessary. When salting in the churn, put on about one-half of the salt; then tilt the churn one way and put on half of what is left; then tilt back the other way and put on the balance. When all the salt has been added the churn may be turned over slowly by hand a few times; or, the best way is to have a large wooden fork to mix the salt through the butter evenly. The butter may be either left in the churn or taken out into tubs and let stand for about two hours for the salt to dissolve before working.

When salting in the churn, it is best to estimate the quantity of salt required from the number of pounds of milk required to make a pound of butter. The quantity of salt will have to be varied to suit the market for which the butter is intended.

The export market requires only about one-half or five-eights of an ounce, and our local market one ounce. Salt for butter should have a fine, even grain, and be kept in a clean, dry room, free from any impure surroundings, as it absorbs bad odors very quickly.

The object of working butter is to rid it of the surplus moisture, to distribute the salt, and to unite the granules and give the butter consistency; and it should not have any more than will accomplish this. One of the advantages of salting in the churn, and allowing the butter to stand until the salt is wholly dissolved, is that much working is not required, as the butter only requires to be worked until the color is uniform, or when the streaks caused by the salt disappear. About twelve to fifteen turns of the worker will be found sufficient. When the butter is salted on the worker, and is only going to be worked once, the worker should be given twenty-five revolutions to thoroughly mix the salt, and if there is an excess of moisture it will require a few more turns. The working should never be done when the butter is at too low a temperature, as it injures the grain; 55° will be found about right.

The butter may now be put up either in pound prints or packed in boxes for market. Care should be exercised in packing, as it is very important that the sides be packed firmly so that the butter will present a solid appearance when stripped and put on the counter for sale.

Now just let me say a few words in conclusion. Keep yourself and everything in and about the creamery clean and tidy, and always do your very best to make a uniformly fine article.

A MEMBER: Mr. Muir spoke of only working the butter once, giving twenty-five or thirty revolutions. I would like to ask if you were going to work twice, how long would you leave it before you gave it a second working?

Mr. MUIR: That depends on the kind of salt you are using; some salt will dissolve in a couple of hours and some takes three or four.

Mr. EDGAR: I think Mr. Muir has covered the ground very well. I would like to ask him if he thinks there is a danger of over-ripening cream?

Mr. MUIR: Certainly just like ripening an apple. If you get it to the ripe condition you get a rich aroma; if you go beyond that you will spoil the flavor.

A MEMBER: I agree with you there. I have known makers to say there was no danger of over-ripening cream. What do you think is the proper time to take to ripen cream?

Mr. MUIR: That is determined very largely by the condition of the cream you receive. If you get your milk in nice condition you can ripen it in from five to seven hours.

A MEMBER: Do you think there is any advantage in getting your cream ripened in five hours instead of taking twelve to ripen it?

Mr. MUIR: I think so. I think you will get better results by quick ripening.

A MEMBER: Have you ever had any experience in cream foaming in the churn, and if so what is the cause?

Mr. MUIR: Yes; the cream is too low in temperature, or too much cream in the churn.

A MEMBER: Do you think slow ripening would have some effect that way?

Mr. MONRAD: I doubt whether that would have any effect. My experience is exactly as Mr. Muir says. I always had foaming cream when I made butter on the farm and got too much cream in the churn When churning at a low temperature was first introduced I, like a great many practical men, was very skeptical. I tried to churn at a low temperature from cream of deep setting, which was not so rich as seperator cream, and I had to learn, as was shown in the able paper just read, that you must have very rich cream to churn at that low temperature. I cannot see any reason why it should make the cream foam if you ripen it quickly. I would like to ask Mr. Muir what is the advantage in ripening your cream in five hours instead of twelve?

Mr. MUIR: I think you get better flavor.

Mr. MONRAD: That has been my experience.

Mr. BARR: Then I would judge by ripening cream in five hours, you would churn five hours after separating.

Mr. MUIR: No.

Mr. BARR: Does not that cream still keep ripening after you churn?

Mr. MUIR: After your cream has cooled down to 60°, I do not think it ripens very much till the morning.

Mr. BARR: I am inclined to think it develops a good deal.

Mr. MONRAD: I do not think the lactic acid develops very much at the low temperature, but there is certainly a change in the condition of the cream. As a practical butter-maker, I find there is something else besides acid in the ripened cream. I do not think you can go by the acid just alone. The thing is to get the right kind of acid. As to ripening, I will prove it to you practically. Some of our men say forty-eight hours, and they claim they can make better butter with cream ripened in forty-eight hours, and even fifty-five hours. I have never been able to get a good result. I agree with Mr. Muir, but I confess to be a little skeptical as to the difference between ripening in five hours and in twelve hours. Until I am convinced by experiment, I will be a little skeptical on that.

Mr. MUIR: I want to bring out a point regarding the advantage in ripening in five hours. In my creamery I get a chance to cool that cream down and go to bed with a good conscience, knowing that my cream will be ready to churn in the morning. If I take twelve hours, you can see where it brings me to in the evening. I do not like to work till twelve o'clock at night or two o'clock in the morning. The advantage, to my mind, of ripening quick is that you get the cream right there. I would not have my cream quite ripe in five hours; I would allow for a little ripening after. Why do we ripen cream?

Mr. MONRAD: To develop the flavor that is in the butter.

Mr. MUIR: What is that?

Mr. MONRAD: It is like the cow. The inside of a cow is a very dark place, and we do not know much about it. When I first started to making butter in Denmark twenty years ago, I thought I knew all about it, but my ignorance is increasing and I know less and less.

Mr. MUIR : Do they use a starter to ripen cream in these creameries that take forty-eight hours ?

Mr. MONRAD : No, they would not use a starter at all. These are some of our creameries that are selling at the highest price. My own experience is that I can always get a finer flavor by ripening quicker.

Mr. MUIR : We get through separating about eleven o'clock, and then we have our cream ready to cool down five hours after that. Then it is ripened, and it is in proper condition, I consider, for the churn the first thing next morning.

Mr. MONRAD : It is not quite ripe then ?

Mr. MUIR : No, I do not consider it ripe for churning then.

Mr. MONRAD : What kind of churns do you use in Canada ?

Mr. MUIR : Nearly all square trunk churns.

Mr. MONRAD : How do you cool it ?

Mr. MUIR : By running cool water around. We stir the cream ; we separate at 90° to 95°. The cream is at a temperature of 76°. The starter is always cold, and that brings the cream down. We put our starter in right after separating.

Mr. PEARCE : Have you got a large receiving vat ?

Mr. MUIR : Yes.

Mr. PEARCE : The milk is coming in fast ?

Mr. MUIR : Yes.

A MEMBER : You have 2,000 lbs. in that vat ?

Mr. MUIR : Yes.

A MEMBER : You are running your separator, and you keep the full body of that milk at 90° ?

Mr. MUIR : No, we heat that to about 65° in the receiving vat ; we have the special heater elevated so that the milk flows from that into the separator.

Mr. PEARCE : I want to know whether you keep that milk warm on a hot summer day ; some creameries do that and I think it is a dangerous practice ?

Mr. MUIR : It would not be necessary to heat it in the receiving vat in the summer time at all.

Mr. J. F. MILLER : In former years I have been cooling the cream at 58° and ripening at that temperature, and then cooling down to 52° and churning at about 52°. This year, I thought I would try the experiment, and I have been ripening it between 60° and 70°. I have been ripening at 64° and up to 70°, and I find we get the best results from ripening at 70°. We get through separating about eleven o'clock. About eight o'clock my cream is just getting nicely thick, and then I start and cool it down, and I find that by using ice or snow or cold water, that it is cooled down to 54° or 52° in the morning, and then I think it is ripe for churning ; the cream has a glossy appearance. I think this is a method saving a great deal of time and labor and as the results are good, I do not see why it should not be continued. We have been sending our butter to the Old Country, and we never made as fine a flavored butter as we have this winter. I am in favor of ripening at a high temperature and cooling down after. I believe the cream should be cooled for five or six hours before churning.

Mr. MONRAD : How long does it take you to cool that cream, and how much cream are you handling now ?

Mr. MILLER : We had 2,300 lbs. of cream Monday morning of this week, and we cooled that cream down in an hour and a half.

Mr. MONRAD : Simply by running the water around ?

Mr. MILLER : Yes.

Mr. MONRAD: What is the temperature of the water?

Mr. MILLER: We use ice and snow.

Mr. SLEIGHTHOLM: I cannot see the necessity of separating milk at 95°. I may be wrong, but I think that would depend a good deal on the separator. We are separating at 65° to 70°, and I think it is a great saving because you have to heat your milk to 95° and then cool it down again. We never separate higher than 85°, and we separate to a trace, occasionally to .1. I am inclined to think that milk is heated to altogether too high a temperature. Now in working butter I think ten or twelve revolutions of the worker is enough. If after working the first time the butter is solid in the churn, I would allow it to stand and hardly work it at all. What you require is a thorough distribition of salt in the butter, and the purpose of letting it stand is to allow the salt to dissolve. I think it is working the wrong side first to work the butter at all. In the first working it is solid in the churn, and allowed to stand, and simply packed in tubs loosely and worked the following morning. We find we get more satisfactory butter with about ten revolutions of the worker

Mr. MUIR: We don't work our butter twice when we salt it in the churn, and I do not think it is necessary.

Mr. SLEIGHTHOLM: Do you approve of the trunk lid churn?

Mr. MUIR: Yes. We have used it for six years.

A MEMBER: Express your opinion of separating at a low temperature.

Mr. MUIR: I said about 90°, and Mr. Sleightholm stated it made a difference which separator you are using. We find we can put more milk through our separator in an hour by heating it to 90°, and where factories have a large amount of milk to handle, I think that is an important consideration. Professor Dean, at St. Mary's, told us that he thought that milk was separated at too low a temperature; that there was a decided advantage to the flavor of the butter in separating at a higher temperature.

A MEMBER: Does the age of the milk sent to the factory make any difference as to the quality of the butter?

Mr. MILLER: Yes; if the milk is kept too long at a low temperature, it is apt to develop a bitter flavor. As a rule factories separate only twice a week, and that is not often enough. We have been separating until this week, four times a week. This week we will only separate three days a week, but it would be better if we separated every day. I think when milk is brought only twice a week to a factory that it has lost some of its flavor.

A MEMBER: What machine is he using that separated at 65°? We use the Alexandria, and we cannot separate at that temperature.

A MEMBER: I have separated from 65° to 85° in the Alpha machine, and I found as it went down the amount of fat left in the skimmed milk increased.

A MEMBER: At what speed does Mr. Miller run the Alexandria separator?

Mr. MILLER: Between 6,500 and 7,000.

A MEMBER: Will a separator separate at its full capacity?

Mr. MILLER: It will do better skimming at 2,000 if its rated capacity is 3,000.

Mr. SLEIGHTHOLM: I never separate at a higher temperature than 90°. I don't think a high temperature improves the flavor. I never tried it any higher.

Mr. MUIR: Professor Dean recommends 130°. How can you state it if you never tried it.

Mr. SLEIGHTHOLM: If I can get a better flavor at 130° I would not do it, because, you spoil the texture of the butter at a high temperature. We cannot get the texture at 90° that we can at 65° or 70°. If we can get a better texture of butter we have other things as well: that is a better flavor and a better texture keeper.

Mr. MUIR: I don't see how 90° or 95° can affect the grain at all.

A MEMBER: A good deal depends on the ripening of the cream.

Mr. MUIR: Flavor is an important thing in butter.

Mr. MONRAD: I would like to ask Mr. Sleightholm if he does not agree with Mr. Muir, that taking any construction of separator, and running it at a speed that is rated at by the manufacturer to run, is it not the fact that there will be a difference—that the lower the temperature at which he runs it, the more butter fat will be left in the skimmed milk?

Mr. SLEIGHTHOLM: Yes, that is quite true; but where is the limit? I don't believe that there is a man running a machine in this country that knows where the limit is.

Mr. MUIR: If he will first skim milk every day he will find out.

Mr. SLEIGHTHOLM: Everybody skims milk at 85° or 90°. I want to skim milk with the lowest possible temperature for first-class skimming up to the capacity of the separator.

Mr. MONRAD: Do you believe the grain is affected at any temperature which is below the natural temperature of the milk as it comes from the cow?

Mr. SLEIGHTHOLM: Yes, I do.

Mr. MONRAD: Would you kindly explain that?

Mr. SLEIGHTHOLM: I am not sure that I can. Better butter is made in a private dairy than is made in the creamery. If milk is separated at 98° as it comes from the cow it will be just as good in texture as if it were cooled first, but it is a vastly different thing to take milk into the creamery at 30° or 40° and then heat it to 90° and separate it. I am convinced there is nothing in this high temperature.

Mr. MONRAD: I said yesterday, and I take occasion to repeat it to-day, that I am speaking principally from the standpoint of the pen and ink butter and cheese-maker. What I am going to say now is from the standpoint of my friend Muir, a practical butter maker. I went into a creamery and took part of the cream that had been separated and heated to 155°, and I churned it, and had it submitted to some of the best judges I could find around Chicago, without telling them anything about it, and I managed to get them to pronounce that the body of the butter, the grain, was equally as good as the best butter from the creamery. Mr. Muir drew attention to this all important fact that just in proportion as we heat our cream, we must cool it lower and longer. If I heat my cream to 110° I must cool it lower and longer before churning; if I heat to 150° I must cool it still lower and keep it still longer at the low temperature.

Mr. SLEIGHTHOLM: Does not that high temperature affect the texture?

Mr MONRAD: The judges could find no difference.

Mr. SLEIGHTHOLM: Why do you cool it?

Mr MONRAD: Because by cooling it I reconstruct the butter crystals. When you work your butter, why do you not finish it at once as some of our butter makers do, just to get it away quick? Why do you stop if the temperature of the butter is a little too warm and put it aside in the refrigerator? Is it not to allow the butter globules to retain that elasticity they have naturally. If I do not cool my cream very low and very long I have always got poor grain and poor body; but if I do cool it properly, the commercial men do not kick on the body of the butter.

Mr. BARR: Can Mr Muir tell just when the cream is ready to cool down from 65°?

Mr. MUIR: That is to be gained by experience. We commence to cool it down just when it starts to thicken.

A MEMBER: Do you get as uniform a salting by salting it in the churn as in the worker?

Mr. MUIR: Yes, more so and with less work.

A MEMBER: Do you think you get a better body or grain by salting it in the churn than you would by working it in the worker?

Mr. MUIR: You are more sure by getting a uniform color by less working, and the less work you can give butter I think the better.

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## WINTER BUTTER MAKING.

By J. H. MONRAD, Secretary Illinois State Dairymen's Association.

Your worthy Secretary has made it rather easy for me by placing the subject "Practical Butter Making," before mine, as I expect the gentlemen before me to have covered most of it. At least I cannot see how they can help themselves, as surely no practical farmer would ever think of making butter just during five or six months.

I certainly presume it will be trite in the highest degree when I attempt here to mention the advantages of winter dairying; they are all old stock arguments well known to men enterprising enough to attend this meeting.

That the same cow bred so as to calve in fall instead of spring will produce more milk during the year is an easily explained fact, as the fresh spring pastures will stimulate her to greater yield at a time when nature would let it decrease.

Under certain circumstances the cost of feed must be considered higher during the winter, but this is certaintly counterbalanced by the cheaper labor in milking and caring for them at a time when outside work is scarce.

Many experienced dairymen dispute the fact that winter feed is more expensive than summer pasture. If we can grow twice or three times the amount of fodder per acre in the shape of silage, oats, hay or roots as compared with pastures, it may well be a question if the labor saved by the cows doing their own harvesting is not counterbalanced by the reduced interest on cost of land, etc. That it is better to have the cows be dry during the hottest two months, when flies are plenty and grass scarce, no practical man will deny.

I am in a queer position, as I am supposed to talk on winter butter making, and yet I am only a believer in it to a certain extent. It is true that it is as absurd to feed the cows twelve months and only look to them for returns for five or six or even seven months, as it would be to hire a man for that time and let him loaf five months. Give him his vacation of a month or so, and give the cow hers of six weeks or two months; but there the line should be drawn.

As long as there is a considerable difference in the price of winter and summer butter, it would seem to be the most profitable plan to have all the cows to come in during fall, but in spite of recent Iowa experiments, I am old fogey enough to believe in the flavor producing quality of fresh milk—cow's milk as yet, and hence, it is not my desire to persuade you to have all your cows calve in fall nor need I fear your succeeding in it.

If your wish is to continue making cheese in summer and keep up your reputation for its quality, it would be well to let half your cows calve in spring and the other half in fall.

We live in an age crying for uniformity, and if we have the conditions as to period of lactation remain about the same all the year, our chances for uniformity are certainly better. If the same conditions obtain among your patrons as among those of our western States, I must warn you against the treacherous every other day delivery. Though the milk does not get as sour as during the warm season, detrimental bacteria have nearly as good a chance to develop, and the fault of bitter milk is often due to this cause.

But, says the creamery owner, it does not pay to haul the milk every day. In that case, all that I have to say is that we must go back to the gathered cream system, using separators on the farm or in small skimming stations. To leave the milk twenty-four or thirty-six hours to the vicissitudes of the farm is absurd, and should at once be abandoned if in use. Even though the period of lactation as well as the feed has something to do with flavor, the main weight should be laid on the ripening of cream, and when I speak about winter butter making this must be the centre pivot on which everything turns.

And now we touch the climatic conditions. Fifteen or twenty years ago we spoke glibly about dairy belts, but who dare now draw the line in face of centrifugal skimming and artificial retrigeration? While the latter helps us over the otherwise usual loss of fat in the buttermilk during the hot weather, we must create artificially the needed temperature for ripening our cream when making butter in winter. Here again simple justice to the maker demands that we construct our creameries so as to give him complete control of temperature in winter as well as summer. Temperature is the Alpha and the Omega both in cheese and butter making.

In speaking about ripening cream and our desire for uniformity so much needed for export butter, I cannot but take issue with the experiments made here and in the States with commercial starters, at least to a certain extent. The stations have proved that quite as good a starter may be prepared from selected milk, and to this I say "Yes and amen." That certain manufacturers of commercial pure cultures have made ridiculous exaggerated claims for their effect, should not blind us to the fact that a reliable commercial ferment or starter will help us to uniformity in developing the flavor, just as sure as commercial color has helped us to greater uniformity in color, and commercial rennet extracts to more uniform work in cheese making.

The average creameries do not all have the same facility for getting perfect milk, and can never get as uniform results as may be obtained by pasteurization, and the use of a reliable commercial starter. If you do not pasteurize your cream now for export butter, it is to be hoped that Prof. Robertson will inaugurate extensive comparative experiments on that line, experiments which I had hoped to have seen carried out in the United States a year ago.

With perfect milk you can make better butter from unpasteurized cream, but even with the very best, I dare not flatter you by expressing the belief that you, (any more than your cousins across the lakes), will succeed in getting better milk at your creameries.

The closing up of cows in stables not properly ventilated, permeated with germ laden dust from the fodder and the excrement, are not conducive to the production of perfect milk. There is also general neglect of carding and brushing the cows, a neglect that is all the more astonishing when we consider the time spent in grooming the horses.

While pasteurizing the cream is not a panacea for all evils, it is certainly a great promoter of uniformity.

Provided you have the same quality of milk and complete control of temperatures, there should be but little difference between winter and summer butter making.

A MEMBER: What is the cost of an artificial ice-maker?

Mr MONRAD: If you have a good room and power enough to run it, they do not cost more than $1,000. They have been put in for $700, but I do not believe in cheap work because the manufacturers are apt to put in poor material. If you have to build a room of course that will increase the cost. Mr. Hopkins tells me they are highly delighted with their machine. Some men say I can put in ice for less than fifty cents a ton. A great advantage is when you get in say 20,000 lbs. of milk and are rushed, as the makers generally are, you have to go to the ice house and get out that ice and chop it off, but with the ammonia freezer, you just have to turn a valve.

Mr. J. S. PEARCE: What size cold storage room would that power machine control?

Mr. MONRAD: It would control a larger room, but their rooms are generally 12x14 they only run while the separator and churns are running—about four or five hours a day

Mr. BALLANTYNE: Does it take a powerful engine to run this ammonia machine?

Mr. MONRAD: The fact of the matter is these machines do take considerable power, and while the manufacturers only claim five horse power, the Kansas creameries tell me they had to use seven or eight horse power.

Mr. J. S. PEARCE: I would like Mr. Muir to give this audience figures of the returns of his butter up to date. I think it would be interesting to know the result from his creamery, in shipping first-class butter to Manchester.

Mr. MUIR: At the time of leaving home, we only received account sales for first shipment of butter to England, they netted us 20.5 cents per lb, at the factory. Our expenses in getting it there were nearly two and a quarter cents. The butter was shipped through Mr. Ballantyne. It sold for 104 shillings in Manchester.

Mr. PEARCE: What did you have for making?

Mr. MUIR: Three and a half cents. We run on the separator system. The patrons deliver milk three times a week; until this week we were running four times a week. I think, however, it would pay better to deliver every day.

Mr. PEARCE: On an average how many pounds of milk does it take to make a pound of butter?

Mr. MUIR: It took twenty one pounds for December; the butter that sold for 104 shillings was shipped on the 10th of December—fresh made butter, just made the day before it was shipped.

Mr. MONRAD: I hope my remarks about pasteurizing will not be misunderstood. What I am anxious is to get Mr. Muir to divide half his cream carefully, pasteurize half of it, and then have Prof. Robertson ship that to Manchester and see how it comes out. I am not making the assertion that the Canadians can beat the Danes by pasteurizing.

Mr. BALLANTYNE: We can beat them now; I think the finest Danish was selling at that time at about 112 shillings in Manchester.

A MEMBER: What is your method of pasteurizing?

Mr. MONRAD: I would not heat the milk to 150°; I do not believe in that. They pasteurize the cream by having a sort of churn constructed so that the dish fills fast enough to get the cream in a thin layer between the tin and the outside jacket, the cream enters at the bottom and raises in a thin film over this heat surface into a gutter and then runs down to the cooler, and then you cool it down to the ripening condition and then go on as usual.

A MEMBER: Does that effect the flavors from turnips?

Mr. MONRAD: If they are not too bad; it will take out a little turnipy flavor.

Mr. PEARCE: I have been told that it has a tendency to give the butter a waxy appearance.

Mr. MONRAD: If I am not mistaken that is caused simply because they do not put so much water in the butter as we do in the States.

## PRESENT DAY DAIRY CONDITIONS.

By J. W. ROBERTSON, DOMINION AGRICULTURAL AND DAIRY COMMISSIONER.

I have listened with very much pleasure to what Mr. Monrad has said this morning, and I have followed what he has written, as he is a well known writer on agriculture. I may say his conclusions are applied to the conditions which he knows. Many of these conclusions may be applicable, without change, to our conditions, while a few of them might require a little modification.

In speaking on this subject of winter butter making let me first say, that there is a very active and growing demand for butter made in the winter months. It is not long

ago since the leading exporters of butter in Canada memorialized the Government not to send any winter made butter to England, because, it was not the kind of butter wanted there. Now the largest quantity of butter made and sent from Denmark, is made and sent during the winter, and the British public are willing to take winter made butter as well as summer made butter. I will put what I have to say under three heads. First, in winter butter making there are difficulties at the stable which the dairyman has to overcome successfully. A comfortable stable is essential to profitable winter dairying. A man need never hope to make any money from dairying through the winter unless his stable is comfortable. The temperature must not go below 45°. If a stable is cold and drafty he may get some butter, but he will get it at a cost to himself, much greater than his revenue. Stables can be made comfortable in this country quite easily. If you have nothing better put some boards around the walls inside and fill up with straw. Stables must be kept clean, the cattle must be kept clean; currying cows once a day in the stable will give you a chance to make butter, so that you will do as well getting two cents a pound less for butter, than if you did not curry your cows; they give more milk and a better quality of milk. If you will distract a cow, or over-drive a mare suckling a colt, and then let the foal suck, you will have a sick foal in an hour and a half. The uncomfortable condition of the mother will prevent her from giving wholesome milk. A good deal of our winter butter is flavorless, because the cows have a flavorless existence. Milk is an essential product of animal life; if that is lived up to its best in the stable, it is just as good as the pasture field, and if you have good ensilage it will make a difference in the milk and the color of the butter. I can, by feeding ensilage, color the butter without a single drop of coloring matter in the cream.

Then there comes the question of handling the cream itself. In handling cream, first of all the main effort should be to keep the cream separated from all else. There is a danger of lots of things getting into the cream, and everything that gets into the cream is injurious and damaging, no matter how it gets there or why it gets there. Cows' udders should be washed or brushed before the cows are milked. There is no gain in the aeration of milk for butter making By aerating milk you do either one of two things: you either take out a little of the odor in the milk, or you bring into the milk something from the air. Now there is nothing in the air of a stable, which by getting into the milk can improve it; therefore the less of that you get into the milk the better. There is not any volatile odor in milk which makes it inferior for butter making. The aerating of milk for cheese making is essential, but the aeration of milk for butter making is quite a different thing, with a different result. The only value of aeration, is if the cow gets odor into her feed, you will get a little of the odor out in that way. You have the "cowey" smell. The cowey smell that comes from the manure getting into the milk is abominable, but the cowey smell that comes in the milk is a delicious flavor. I never knew a cow to give a bad flavored milk unless something got into that milk.

In handling cows and milk for winter butter making, it is desirable to have fresh calved cows in the herd. Let a man ever so well aim at making all his cows calve in September, in two or three years he will find they will calve all the year round, and that is how a man will make most at dairying by having some fresh milk coming in. By that means he gets a better flavor and an easier separation of the cream from the milk from the cows calved more than six and a half months. Set the milk in deep setting pails. I did not get more than two-thirds of all the cream out of the milk; then I added the milk of one fresh calved cow to the milk of twelve of these cows who were at a later period of lactation, and instead of losing thirty-four per cent. I lost only fourteen. I tried adding water, but it did not have the same effect; I also found by adding the milk of a fresh calved cow, it made a better flavored butter.

When winter butter making was begun, not far from here, in 1892, the two first winter butter making creameries running in Canada, were under my control, and managed by Mr. Dillon and Mr. Ruddick. When they were first started we had some difficulty in getting a nice flavor in the butter, because all the cows had been milking for perhaps from seven to eight months. In the following years, as the farmers got more fresh calved cows, we got a better flavor in the butter.

I want to show you the helpful action the Government can give you farmers. When the Government started these two creameries, five years ago, people said it was a bad idea. Now there are 150 creameries running in Canada this winter, with the number increasing every year. The flavor of butter comes from one of three or of all of three sources: First, from the butter fat. It has some flavor, not very much; that is in the fat put in the milk by the cow. These flavors are nearly all of a sort of unstable character, they will give off very quickly; that is what is called the delicate cream flavor in butter. Then there is the flavor that most people seem to go most by, the flavor that is put in by adding salt; and there are still people in our country who insist upon improving the flavor by adding salt. The other flavor that is in butter is a flavor of flavors, that comes from fermentation. This is the flavor that you can control nearly altogether by so-called pasteurization or by sterilization, or by adding a "starter." The odor of a thing and the flavor of a thing are quite different; you can get an odor by your sense of smell and flavor by the sense of taste. You may have an odor in butter, and you may also have flavor in butter, which is the taste of butter.

Can the odor and flavor of turnips be taken out of butter or cream or milk? I fed a group of cows 80 pounds of Swedish turnips per day for the purpose of saturating the milk with the odor of turnips. Then I heated one-half of the milk to 152°, and the other half I did not heat at all, and then I cooled this milk down and set the milk in the usual way and ripened the cream, and the odor and flavor of turnips were clean gone from the butter and from the milk that had been heated to 152°, and there was a most pronounced and decided flavor and odor in the other butter. By heating the milk to that point I found I did not get as good butter. That was before the word pasteurising was in use. Then we took the cream from the milk and we heated one-half the cream to 155° and the other we did not heat at all. Again we found that by heating the cream we put out the odor and a flavor of turnips, and the butter made from this heated cream was entirely free from that objectionable odor, and had a delicious flavor and a better body than this other butter. I have heard people say that if you pour milk from a dipper into a pail you smash up the butter globules. (Laughter.) We have found always by heating cream to 155° we can eliminate these volatile odors that the cow puts in the milk by her feed. Pasteurization is the work of a French scientist, Louis Pasteur. His work was perhaps of more service to humanity than the work of any investigator who has lived during the last one thousand years. In one little discovery alone he has saved the lives of fifty thousand mothers all around the globe. He is a saver of the people, worth more than all the Napoleons that can grow on every square inch of French soil. This great man, modest in his way, went on finding out how to destroy these very minute forms of life, and he found by heating liquids like milk to 158° that you would kill most of the germs that make fermentation; and so by treating milk that way is called pasteurising it, from this man's name. That is not sterilizing milk, which is making it entirely free from these germs—some will not be destroyed even by boiling. Then by pasteurizing cream, (heating it up to 158°), you will destroy all these forms of life that make fermentation, and give you this flavor or odor that comes from fermentation. A few years ago there was so-called pure culture offered for sale which, when put into the cream after the other forms of life were killed, would grow there and give rise to its own peculiar flavor. Chemists and bacteriologists had taken samples of some butter, and they found some bacteria in them. They had made pure culture of this, expecting when they grew in cream they would give rise to peculiar flavors and odors. These pure cultures were offered for sale, and if you put some of this pure culture in sterilized cream and pasteurized cream you get a very good flavor. We pasteurized several lots of cream from the same lot, and then we used some of this pure culture in one lot, and then we took some skim milk which we had pasteurized, killing the forms of fermentation, and we exposed that in our own creamery for fifteen minutes and we got on that skim milk the germs from our own creamery, and we made a culture of that, and put that also into some cream that was pasteurized, and then we made butter several times from these different lots of cream, and the result was that the flavor from the butter made from our own starter made from the kim milk, was better than the flavor from these special starters, decidedly better, and

the butter kept much better. What does that mean? It means that the people who eat butter have come to like a certain flavor. That certain flavor has always been the result of a great many forms of life in the cream, and these forms come from the rooms where the floors were kept clean and the air smelled sweet and, if you have a dairy where your air smells always sweet you can get no better starter than by exposing your cream to the air of that room. That gives the flavor people like. It comes to this, that if your dairy building smells nasty, some form of life is living there that produces bad smells. You cannot afford to have a dairy building smell bad. That is why it would be a first-class thing if the dairymen of the Province of Ontario would form a huge fire insurance company for themselves and willingly burn up one half of the cheese factories and build new ones this spring. Bad smells are so persistent that it is almost impossible for the cheese to escape the whole season. Our buildings are tainted with odors that we get into our cheese against all the skill of all the makers. It will be worth your consideration as to whether it would not pay to move your building a mile away. Your site has become so foul that if it does not smell quite to heaven, it smells over three concessions. Every bad smell from a dairy building comes from the action of some low form of life, and it will doubtless get into the milk and live there, or into the cheese and live there, and if it does that you have this foul flavor to fight against. In this connection I think every creamery and cheese factory should be thoroughly whitewashed inside once every year. In my native county, where dairying was the main stay of the people, I made enquiry last year, when a farm was to let and fifteen or twenty men were tumbling over one another to rent it at $15 an acre. I never knew a case of disease on that farm. Every cow stable was whitewashed twice a year no matter what else was neglected. It is the best thing you can use, it makes light, and light kills most of these things.

Down in a cheese factory in the eastern part of Ontario, the cheese-maker was troubled with that difficulty called rust in his cheese, making his cheese look red in streaks all through. Investigation was made by Professor Shutt, of the Experimental Farm, and then it was carried out this summer by Dr. Connell, bacteriologist of Queen's University. He went to the factory several times to find out the cause, and he found it at last in one of the gutters, growing in the side of the gutter, and when the wind blew that way into the factory, then the cheese-maker had rusty cheese, because the wind carried this bacteria into the factory. By using a weak solution of ordinary bluestone and whitewashing all the floors and gutters with that, the trouble was entirely removed. The cause was destroyed and the consequence of course did not follow and the factory was free of that trouble. That is an instance that proves that both in creameries and cheese factories these gutters should be scoured out. Why did I not say things like this ten years ago? I did not know so much. On Prince Edward Island when I went there first, seven or eight years ago, they had never seen a potato bug. Last year the potato bug was so abundant that the Government had to buy Paris green to give the people to fight it. A long time ago there were potato bugs in Colorado and they lived on a certain plant that grew there and did not seem to do any injury to anybody. They got over to a civilized place where a man had a potato patch, and they grew and multiplied and filled the whole earth. As fast as the potato grew the bug was there ready for it. Ten years ago there was not the same multiplication of bacteria. As dairying grows our enemies grow. That is why the cheese-maker and the butter-maker want to be equipped for them. Ten years ago we did not have that at all. It is a decided advantage to pasteurise cream, if the cream or milk had been exposed to foul atmospheres, and then to add pure culture. Butter from pasteurised cream is never quite as good as if you make it from this sweet cream that is always kept in that condition. We now have an apparatus for pasteurising cream quickly. We are getting some of these machines from England. It is the invention of a Danish engineer and an English mechanic. The cream is run through one of these and heated and lifted into a vat. We are going to conduct an experiment this summer with this machine. In the meantime I can say pasteurising is an aid but not an essential one.

I want to add one word as to cooling, the trouble with the freezing apparatus is the initial cost and the cost of maintenance. I think in a creamery turning out one thou-

sand pounds of butter in a day, a machine would be the cheapest, but in a small creamery it would be too expensive. If you want to build an ice house or refrigerator at the creameries, the Department of Agriculture will supply plans free to any one that wants them.

The demand in England is growing continuously for a softer bodied cheese. Did any man ever ask the dairyman to make a hard firm-bodied cheese, except to get a cheese that would keep. Nobody wants to eat a firm hard bodied cheese. He wants a soft, fat, rich cheese for his table; a hard body was wanted that the cheese might keep safely. A well equipped cheese factory should have an ice house at one end of the curing room, so that the temperature would not go higher than 70° in the hottest weather, and by that means you would save more in the shrinkage of the cheese in one month, than you would pay for the ice house, and you could make a softer bodied cheese without the risk of spoiling. You would do those three things by having an ice house next to your curing room.

Mr. BARR: Give us your plan of storing ice in the ice house?

Prof. ROBERTSON: For storing ice for its perservation only, we want it to be boarded on each side, to keep the wind from the building, and the floors should be so constructed that the warm earth cannot touch the ice, and the water can run away. The best way to get drainage is to put ten or twelve inches of broken stone or brick-bats in the bottom and cover that with six inches of saw dust, fill the ice in twelve inches from the sides all around, build it up solid and close all chinks with ice. If you want to take the ice out it will pay you to stand it on edge rather than on the flat. It is easier to take it out after the ice house is built in that way. Pack around the sides twelve inches, between the sides of the boards with dry straw or hay, and then cover the top with a foot and a half of hay or straw and have ventilation on top of that. If you want an ice house for cooling only, you require a different construction altogether, which is explained fully in the bulletin I spoke of, which can be obtained by making application.

A MEMBER: How often would the ice house be required to be replenished?

Prof. ROBERTSON: Only once, in the spring. If you have two thousand cubic feet of space in this room to be cooled, then you would want two thousand cubic feet of ice.

A MEMBER: Have you any trouble with the cheese moulding in this curing room, where have you the ice house?

Prof. ROBERTSON: I have not any curing room with an ice house, but I have used ice to cool buildings in this way. Ice used in this way would not tend to produce mould, because it would dry the air rather than produce moisture. There are two things that produce mould—dark air or moist air. A good deal of the mould results from keeping the room dark.

A MEMBER: At what temperature would that amount of ice keep the room?

Prof. ROBERTSON: With a building constructed with a hollow space in the wall and the floor tight and double doors and double windows, fifty tons of ice would cool a curing room with sixty-five boxes of cheese, and keep it at sixty-five all summer, and the ice would not be required to be removed. The building could be put up for not more than $85, and ice is being put in this year for 75 cents per ton by contract.

Mr. MACFARLANE: Can you tell me why one cow's milk keeps sweeter longer than another?

Prof. ROBERTSON: I cannot tell. Out in the North-west we have one patron who drew his cream all last summer only once every five days, six times a month, and it never came in sour or bad. The main cause of souring milk is something that gets into the milk from the air. Sometimes if the cow be of a nasty temperament, her milk will turn sour sooner.

A MEMBER: If the cow has good wholesome food and good water to drink she will give good wholesome milk. Do you know what impurities would be the result of a cow drinking whey, and what effect it would have upon the cheese made from the milk?

Prof. ROBERTSON: I do not quite know the result. I include in the food the water. If the cow drinks water that has any vegetable matter in it, the cow's digestive system will take all that out. If the cow drinks water that has in it any of those low forms of life that make putrefaction, then these germs will go through the cow's system into her milk. There is no way of killing these germs that I know of, except by heating the milk very high, up to perhaps nearly as high as boiling point, so that the only safe way is not to allow the cow to drink water that has putrefaction in it.

Gov. HOARD: I want to know if in the western part of the Province here, wells are easily obtained?

A MEMBER: Yes.

Gov. HOARD: How deep do you go for wells as a rule?

A MEMBER: Twenty to fifty or a hundred feet.

Gov. HOARD: Do you usually have wells at your creameries and cheese factories?

A MEMBER: Yes.

Gov. HOARD: The well unless very carefully guarded is simply a sink hole, and much of the trouble that comes from bad butter is proven to my knowledge through wells. The State Board of Health of Massachusetts investigated three hundred privies to see how the well, being the lowest water level, would by its own action draw to itself and drain to itself the surrounding territory, and you will be amazed when I tell you they dug around three hundred of these privies and in every instance on the side next the well they found a leak towards the well, and in one instance they traced it eight rods. This investigation cost $30,000. Now, I know that there are foul cheese factories with a saturation of foul soil and the constant propensity of these foul conditions is towards the well

Mr. BLAYNEY: The soil has a good deal to do with it. Water comes to a certain level and impurities of any kind will make their way towards the water, so that even in a cheese factory on a sand hill there must be particular care taken, because, sooner or later, any impurity that gets near the well will find its way into the water.

Mr. ROBERTSON: Whey should never be given to cows to drink under any circumstances except it is as sweet as you would give it to a calf. If the whey is sour you should not give it to a cow.

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## WINTER DAIRYING.

By Hon. SIDNEY FISHER, Minister of Agriculture, Ottawa.

A few things have come before me this morning about which I would like to say a few practical words. In the first place, I have been practising for a great many years winter dairying. I believe it to be to-day the solution of a great many difficulties which we dairymen have to contend with. I do not mean to say for a moment that we are to give up summer dairying. I do not mean to say that, as we thought at first, we should have all cows come in, in the fall, but what I believe to be the proper acceptation of the term "winter dairying," is that we should try to produce milk all the year round on our farms and make use of our plant and animals so that they will give us a return every month in the year. In the old days, when we just made cheese in the summer, we practically laid idle during the winter. Our whole investment was idle and to a considerable extent, the profit was eaten up. Is that consistent with good business management? If there is anything that the farmers of our country require, it is to apply good business management to their business. I regret to say that ten, fifteen and twenty years ago that was not the general management of our farms. In connection with winter dairying there are two or three points essential to observe. One of the greatest advantages of

winter dairying is that we are obliged to take care of our stock and look after them well the whole year round. In taking care of stock I have found one or two things essential. Prof. Robertson spoke to you a few minutes ago about the necessity of keeping the cow warm and comfortable. Now, not only is it humanitarian to keep the cow warm, but it is actually money in our pockets. You know perfectly well that one of the very first functions to which the feed of the animal is applied is to keep the machine warm. No animal will turn its feed into milk until it has first warmed itself with its feed. Therefore if you keep that animal in a cold temperature, you call upon the animal to apply nearly the whole of the feed you give it to keep itself warm, and it is only what may be left after that, that will turn into the milk you want. It is much better to warm the animal by good walls, and a much more profitable way than by stuffing it with food.

Prof. Robertson has spoken about the beauties of the sunshine in the life of a cow. If there is one thing in a winter dairy that is necessary to the health of your animals it is that the stable should be bright and sunshiny. Do not give your animals only a square foot of glass ; do not shut out the light. For the sake of the animals themselves, give them all the light, and if possible, put the windows in the south side so that the sun may come in and make them healthy and comfortable. I do not know anything that is more advantageous to good winter dairying than the abundant use of whitewash in your stables. You want light, you want cheerfulness, you want a clear atmosphere. A whitewashed wall will make your stables much lighter than they otherwise could be. Prof. Robertson spoke to you about the difference of absorption of heat in a dark colored and a light colored building. The reflection of light also is better in a light colored building ; you are able to keep it cleaner. The light that is in the building will enable you to see the dark corners. There is no disinfectant that is more easily applied than a good white lime wash. By whitewashing once a year, you will destroy an enormous number of those germs that have been so much talked about of late. You can whitewash better by using an ordinary spraying machine than a brush, and you can do it more effectually. These, perhaps, are small things, but I assure you in winter dairying, as in summer dairying, a great deal of the success of our work depends upon careful attention to small things. A very little here and a very little there, will ruin the whole quality of our final product, not only in the dairy to-day but the final product of the whole factory of which we are partners and part owners in many instances. There is another point with regard to winter dairying about which I wish to say a few words. The feeding of our animals must be changed from our old methods. We must take advantage of the enormous amount of scientific information that is placed at our disposal by our Agricultural College and Experimental Stations. These are not mere theories ; they are statements of well known facts—absolute facts with connection with feeding of animals. You all know there is no food equal for animals to June grass. Scientific men have told us what are the constituent elements of June grass, and they have enabled us to give to our animals practically the same constituent equivalent of nutrition that they get in the June grass. We know to-day, in consequence of the scientific investigation of these men, just what a cow giving milk in the winter needs ; you can find out also just how and where you can get them—in the corn silage or in the clover hay or beets and mangels and carrots and what parts you can get in the different meal feeds that are at your disposal. And you can make such a ration as to give the animal exactly what she wants, and if you do this, you may be quite she will give you what you want.

This winter dairying to a certain extent is an adjunct to cheese making. You gentlemen are probably more generally interested in cheese making than in butter making, but I am glad to know to-day that the cheese makers of this country are turning their attention to butter making, not to sacrifice cheese making, not to give up that business, which has placed them at the head of the cheese makers of the world, but as an adjunct to it which will aid you and encourage you. During times past when you made cheese only you were able to work and make a profit only for six or seven months in the year. To-day you can make a profit for nine or ten months from the same cows. The cheese making in this country has nearly reached its limit as far as the exporting trade is concerned. I hope that as Canada fills up with a larger population, as I trust she will,

the people in this country will learn to eat cheese more than they have in the past. We export nearly 60 per cent. of all the cheese that is imported into England, and meat products—not only pork, but beef and mutton—have reached a point where we can hardly hope that the English workmen will increase his consumption of cheese. If we increase the number of cows in Canada and the production of milk, and turn that into cheese, we will hurt the value of cheese which we to-day send to England; but if instead of doing that we turn that milk into butter, and try to capture the same position in the English butter market that we occupy in the English cheese market, we are bound to see an enormous return for our work.

I will give you an instance of what would have occured had it not been for this butter industry being introduced into this country. Last year we exported a large amount of cheese and about 10,000,000 pounds of butter. If the milk that you made that butter from had been made into cheese, it would have made about 25,000,000 pounds of cheese, and if we had shoved that on the English market in addition to the 150,000,000 pounds we sent there it would have reduced the value of our cheese in the English market, and instead of getting $2,000,000 for butter and the large amount of money received for the cheese, the probability is the decrease in the price of our cheese would have been sufficient to have lost the $2,000,000 we received for the butter. If we are to increase the number of cows in this country, the only profitable way to sell the superabundance of milk is to turn it into butter and sell that butter on the English market.

In consequence of what I believe to be the absolute necessity of reaching out for the market of England, I have felt it to be my duty to provide, as far as I could, for cold storage. It will enable that butter to be placed on the English market in the condition in which it is made in Canada. (Applause).

I am satisfied we can do this. I am satisfied that before the next season of shipping comes we will have a chain of cold storage right from the creamery in Canada to the English butter eater, and I am satisfied our butter will be placed on the English market in good condition, and that we will capture that market for the Canadian producer. I believe that these are important points and that it will be of the utmost advantage to this country. I am glad that this Association is to embrace the butter making branch, as well as cheese. These two branches are inextricably chained together. I will not attempt to trespass any more on your patience at this hour.

The CHAIRMAN: I think it is encouraging to the farmers of Ontario, to find we have a Minister of Agriculture who takes so much interest in the dairying of this country. I hope he will come among us as often as he can, and do all he can for the dairymen.

## REPORT OF THE NOMINATING COMMITTEE.

The report of the nominating committee was presented. Moved by GEORGE HATELY, seconded by JAMES A. GRAY, that the report be adopted. (Carried.) For list of officers, etc., see Appendix.

The CHAIRMAN: I have to thank you on behalf of myself for having placed me in the same position for another term. I can assure you I have done the best I could during the past year. I think I can do a great deal better during the coming year, and I shall promise you now that I will at least do the best I can. I believe we are going to have an important year on account of the amalgamation of the Creameries' Association with the Dairymen's Association. We shall adjourn to meet again at 1.30 sharp.

## REPORT OF COMMITTEE ON RESOLUTIONS.

The Committee presented its report, which is as follows:

1. Resolved that the thanks of this meeting be tendered to the Mayor and Corporation of the city of Brantford, for generously providing the use of the opera house for this gathering, and for the kindness extended to visiting dairymen by the citizens generally.

2. Resolved that we, the members of the Dairymen's Association of Western Ontario, sincerely regret to learn that since we last met in convention Mr. E. Casswell, an old and valued friend of this Association, has passed to the great beyond, and we take this first opportunity of expressing our high appeciation of the splendid services rendered by him to the dairy industry of Canada, and more particularily that of Western Ontario. Mr. Casswell was always energetic and enthusiastic in whatever he undertook, and when actively connected with the cheese trade, was sparing of neither his time nor means in advancing its interests. He was among the first to make shipments of Canadian cheese to England, and to make known our goods across the Atlantic. This Association honored him several times with the highest offices in its gift, and for a number of years he was a Director. We therefore desire to extend to the bereaved wife and family our heartfelt sympathy in the loss of one so highly esteemed and honored by all who knew him.

3. Resolved that this Convention of Dairymen assembled learns with sincere regret of the death of the late esteemed Honorary Secretary of this Association, Mr. C. E. Chadwick. Mr. Chadwick was the first President of the Canadian Dairymen's Association organized in 1867, and its Treasurer for many years, and was also the active Secretary of the Western Dairymen's Association from its inception till his retirement in 1892. In these various capacities he served the Association faithfully and well, and rendered excellent services to our important dairy industry in the early days. This Convention therefore desires to express to the bereaved family its warmest sympathy in the loss sustained and to place on record its high appreciation of the services rendered by our deceased friend.

4. Resolved that this Convention of Dairymen assembled, recognizing the great need for better sanitary conditions in our cheese factories and creameries, would urge this matter upon the attention of the Directors for the coming year, and also upon the attention of the Minister of Agriculture; and in order to bring about this we would beg to suggest that each Inspector be appointed an officer of the Provincial Board of Health.

5. Resolved that this meeting recommends to the Board of Directors that competent persons be appointed in the various dairying districts, to arbitrate in cases where cheese have been rejected at the factories, and to fix the loss sustained if any, upon the proper persons.

6. Resolved that this meeting learns with sincere regret of the recent death of the late Mr. W. S. Campbell, of Brantford. Mr. Campbell was prominently connected with the agricultural interests of this country, and mainly instrumental in developing the dairy industry of this Brantford district.

7. Resolved that this meeting would recommend that the word "Canadian" be branded upon each cheese and each package of butter for export.

H. Eagle: In opening the discussion of the Cheese Branding Bill as President of the Brantford Dairy Board of Trade, I want to make an explanation. It was stated here yesterday evening that the Brantford Dairy Board of Trade had unanimously passed a resolution against the Cheese Branding Bill, and I want to state our reasons for doing so. Buyers on the Brantford Board appear to be unanimous against the Bill. Of course we, as salesmen attending Boards of Trade, have no direct connection, and when the buyers said they did not wish a branding bill we passed a resolution against it. A

number of reports have been received from presidents and secretaries of the different factories, and I think sometimes these reports are misleading. There are a number of factories in this country that were organized as Joint Stock Companies years ago, and I believe the President and Secretary stand on the list as representing these factories at the present time. I can tell you a half dozen presidents and secretaries of cheese factories who have gone out of business years ago, and when they got the Government circular they answered "Yes." I asked one of them the reason for answering a circular they did not understand, and they said they thought the Government wanted an answer and they said "Yes." I think the men mostly competent to deal with the questions are the members of the Dairymen's Association and the salesmen of the different cheese factories, and I hope we will have a full discussion of this matter.

Mr. BLAYNEY: What is the main object at the present of our production in the matter of butter and cheese? Is it not to get it in a better class, to get it in as fine a state as we can? I take it for granted from what I have heard from men like Prof. ROBERTSON and Prof. DEAN, and men like the editor of the *Sentinel Review* in Woodstock, that this is the great object. If this is the case, is it not an absolute necessity that when it gets to England the individual who buys it should know where it comes from—even the very factory where it is made? Would not that be a means of preventing any fraud?

Mr. EAGLE: Under existing circumstances they can trace the cheese right back to the very factory they came from. There is no difficulty about that.

Mr. ROBERTSON: I am in favor of the motion before the meeting at the present time. I am in favor of stamping the word "Canadian." I believe we have lost money in years gone by because of not having that one feature of our brand prominent enough. I thing we have nothing to be ashamed of in the produce we have sent to England. I am not in favor of all the features of the bill known as the "Fisher Bill." In the first place we got a request from the Board of Trade in England, asking that we pass legislation making it compulsory to brand the month of making the cheese. What was the cause of that request? It was because men had sold short during some months of fall cheese, and when it came to the time to buy fall cheese the price went up and they tendered summer cheese on their fall contracts. The men in England did not accept these contracts, and what was the result? It was given over to the Board of Arbitration, and the men had to settle the difference or take the goods off the hands of the men they had sold to. Since that time we have never had a request from the importers of England to brand the cheese. From my little experience in dealing with the English people, I am of the opinion that you cannot palm off on the English consumer September cheese at the full September price, unless the quality of that cheese is fine. We don't sell September cheese because they are the month of September; we sell September cheese because we have the finest fall cheese made in September. There has been times in the past few years when we have had the finest cheese made in October and the first part of November. I do not see why we should lose that price by branding them as October cheese. If they are equal to September why should we not obtain the best price? We have not always June weather in the month of June. Last year we had June weather in May, and I can testify that we had as fine cheese manufactured last year in the last half of May as I have ever seen in any factory in June. Why should we prejudice the English consumer by branding the word "May" on that cheese? The English people have been very kind to ask us to brand our cheese. What is the fact in regard to their own cheese? They have no mark or date on them, and the highest price for cheese in Scotland to day is for June cheese held over to the following spring. If we put the date of the month on the cheese we will prejudice the buyers, and we will receive a poor price, and I think we would be making a great mistake in passing such a Bill. I would like to call attention to one of the remarks Mr. Eagle made. I had replies from four or five makers who told me they had replied in the affirmative as in favor of the bill, but now they understand the conditions they are opposed to it. This morning I spoke to two makers, and they said they would be in favor of branding the word "Canadian" on, and possibly in favor of putting the registered number of the factory, but they were not in favor of putting the

date on the cheese. Most cheese sent to England are sold in 500 and 1,000 box lots. We have gone to a factory and bought the last half of the month, and sometimes we got the factory to keep back thirty or forty or give us thirty or forty of the succeeding month to make up the required quantity. If the bill proposed became law and we turn in a single box of July cheese with June cheese, they would not accept it. The farmers in this country do not get their price according to value. I do not believe there is the discrimination made according to quality there should be. Two years ago, when in Scotland, a gentleman showed me some cheese of the previous year made in an ordinary dairy in Scotland, which he was selling for sixty-six shillings per cwt., and the cable quoted cheese at forty-nine shillings. We are not able to get that difference between the different factories, but it is frequently the case that our finest factories obtain four to eight shillings per hundred more than other factories. This is from two to two and a quarter cents per pound. If the factories making the finest cheese were getting that extra price I think it would stimulate the others to make better cheese.

Mr. Pattullo: As a member of the Committee on Resolutions I would like to make an explanation. In view of the fact that Hon. Mr. Fisher, the Minister of Agriculture, is here, I think it is due to him to explain, on behalf of the Committee on Resolutions, the form of that resolution. The committee felt that they were representing this whole Association. We felt that public opinion among the dairymen was positively unanimous on one point—that is with reference to the branding of the word "Canadian," but with reference to the other points public attention is very much divided, and the Committee felt that they had gone sufficiently far when they brought the resolution in, in the slightest form possible, and left it to the Association to change it if they desired.

Prof. Dean: I would like to say one word on this question. It seems to me there can be no good reason for having the name of the month on the cheese. The question was asked me at a farmers' institute some time ago, "Was I in favor of branding the cheese?" I said in the first place I was sorry it had ever become necessary for this request to come to us from Great Britain; in the second place I said I would be in favor of staving off that request as much as possible, but if, in the interests of our cheese business, it would be necessary to brand the date of manufacture, I would be in favor of putting the day of the month. I will call your attention to the way we mark cheese in the Dairy Department of the College—each one is lettered. That shows to us that a certain cheese was made in Vat L on the second day of the twelfth month—on the 2nd of December. I think one advantage of marking cheese is to show the maker where he has made a mistake. If it were necessary to mark the cheese in any way I would be in favor of some plan like that. I may say we sent this square cheese to the Convention that the makers here might see it. We were making some experiments last year on square cheese, and we purpose sending forward a shipment to London, England, very shortly of a few square cheese, to see how they take.

Hon. Mr. Fisher: If the audience is not disposed to discuss this question any further, I would like to make an explanation, as I find this is called the "Fisher Bill." In the first place, I want to give you to understand that when I introduced this Bill at Ottawa, last session, I stated to the House that I had no intention or desire of forcing that Bill on in any way to adoption. I felt that this was a question which essentially concerned the dairymen of this country, and I wish to bring the attention of the dairymen all over the country to this question—not simply one class or one section, but all sections of the dairy business, and I divide the trade into three sections. First, the man who produces the milk; secondly, the man who manufactures that milk up to the finished state; and, thirdly, the man who handles that finished article afterwards.

I want an expression of opinion from all three of these different branches of the trade. I could have obtained an expression of opinion from the House of Commons upon this question easily enough. There was some information given on the floor of the House, but I felt I could obtain a much truer expression and come much closer to the people especially interested in this trade, if I was able to come to the Dairy Associations of the country, and it was for that reason I put over the Bill so as to be able to come to these great dairy

meetings in the Provinces of Quebec and Ontario and be able to find the real feelings of the people interested. (Applause.) It was for that reason I have asked your opinion. I am completely and absolutely open to conviction on the matter. I drew up what I believed to be a proper law for the accomplishment of certain things, if these things were desirable, and this is the entire extent and scope of the Bill with which you have connected my name. If these things were desirable I think the Bill we have drawn up will accomplish the end in view. If they are not desirable, I have no desire for one moment to make them law. (Applause.) I am not going to enter into an argument. It is not my place to do so. I wish to stand aloof and to hear the opinions and arguments and receive information and the views which you have placed at my disposal. I will just, however, say that for the last two years in the Province of Prince Edward Island the Department of Agriculture has been managing a large number of cheese factories, and for the last two years the date of every cheese which has been sent out of Prince Edward Island has been stamped upon the cheese, and this last season Prince Edward Island's cheese commanded a price very nearly, if not absolutely, equal to the best Canadian cheese offered in England. Now Prince Edward Island is a new dairying country. They have started in this business new, and they have adopted this rule, and it seems to work well there. Whether it would work well in a country where there was a different method of trade established, where you have established a certain reputation for certain months, I cannot say, as it is evident to me that some months do not compare as well as others. If you wish to continue that, you must not put the stamp of the date on the cheese; but I believe if you wish to raise the reputation of your May cheese and July and August cheese in the market, let it go and be sold for May, July and August cheese, and within a year or so you will find Canadian July and August cheese will sell at a higher price than it does to-day. If the dairymen of this country do not wish this Bill to pass, I am very glad to meet their views, and pass it just so far as it is in the interest of the trade. Therefore I feel that in this respect your Association would only justify me in going so far as one item: putting the brand "Canadian" on the cheese. The Dairy Association of Quebec declared they were ready to go the whole way, putting the name Canadian on and registering the factory and date. At Brockville they went so far as to say they were ready to put the word "Canadian" and to register the factory, but did not want the dates. You are ready, only, to go so far as putting "Canadian" on the cheese. I want to tell you that what I am working for and and what I am determined to do is simply what would be to the interest of the trade.

Mr. HARLEY: As representative of the Woodstock Cheese Board, I would like to say a word. It was brought before the Board at Woodstock, and we were requested to determine what our opinion was; I said then I thought it was premature. I thought the Dairymen's Association should first discuss the matter, as they were more able to do so than we were; but from the information we received there, from those who were exporters of cheese, it would not be to their interests as exporters. They thought it would be detrimental to their interests to have the brand upon the cheese, and it was unanimously carried that the date and month of the manufacture should not be put on the cheese. We were in favor of having the stamp "Canadian Manufacture" upon the cheese, and I do not know that there was much objection to have the factory registered with the number of the factory. If that motion before the chair at the present time would be thus amended, before being put to this meeting, I think it would meet the view of the majority of the members of this Association, but if the question is to be recommended by the Committee of Resolutions, I do not know that we can get a fair expression.

Mr. EAGLE: I do not know that there is a factory in Western Ontario but what at one time or other has cheese that is not absolutely up to the mark. If there is a registered number on the factory, it goes clear through, and the word comes back that they do not want any more cheese of that number. At present there is not a box of cheese goes out without there is a certain number on it and it can be traced back. It is just as good as if there was a registered number on it, and the only way to save the poor cheese-maker is to leave it as it is at the present time.

A MEMBER: It seems to me that the sellers of cheese want to have the privilege of selling one month's cheese for another. I think these cheese buyers who are opposing it have the cream of the joke all the way through.

Mr. Elliott: We used to brand our cheese and we managed to struggle along at 12 or 13 cents a pound with the date branded on them, and now if we could brand our cheese and go back to the same old price it would be all right.

Mr. Wooley: Do the buyers in the old country buy cheese from date or quality? If the cheese was dated a certain month, what difference would it make to the buyer who buys upon the quality; and it seems to me that if factorymen and salesmen take an interest in the business they will soon learn if the buyer buys May cheese and sells it for September. It seems to me it will not occur very often. I will move that the word "Canadian" be branded upon the cheese.

Mr. P. H. Green: I do not believe the buyers of this country have any intention of practising any deception on the people of the old country. I have been in business six years, and it is not long since I heard our late lamented secretary say that he never met a lot of men who were more square and conscientious in their dealings than the buyers on the Brantford Cheese Board. $290,000 worth of cheese have been sold on the Brantford Board without a hitch. When the question came to me from the Dairy Department in reference to the marking the date upon the cheese, my answer was I thought it was not advisable. I think it will be much better for our cheese to be sold upon its merits. Nearly every month's make is sold upon a different market. September cheese is always sold as September cheese. We factorymen have not facilities for holding cheese over. We are obliged to ship out each month's making by itself. Then I think it will be a great mistake to date the cheese.

Mr. Harley: The men who deal in the old country are not blockheads. A man comes into a store where there is cheese for sale, and he wants a hundred or five hundred boxes of cheese. There are the cheese. Look at them. If they suit you I want so much for them. The man goes over the cheese, they suit him, and he says the price and there is nothing more about it; whether they are May cheese, September or October cheese, and the sellers tell me it is an advantage not to have them marked, because even the date upon the cheese would prejudice many buyers against them.

The motion was carried.

## ADDRESS.

By Mr. D. Derbyshire, President of the Eastern Dairymen's Association.

I am delighted with the discussions that have taken place at this Convention. I have been more than pleased with the addresses all the way through. I think it would be well for us to review some of the points that have been brought out, and one of them I would like to refer to is this, the references to cleanliness that were made in Mr. Barr's paper yesterday. There is no doubt the maker would have more influence with men furnishing milk to the factory if he himself were clean about the factory and clean in his own person. You cannot have much influence in that regard if your are not clean your self. How can you tell the patron his can should be kept clean and away from foul odors unless you yourself are practicing what you are preaching? So I say the very first point is that the cheesemaker himself, in his personal surroundings, should be perfectly clean, so that you can exercise the proper influence over the persons furnishing milk to the factory. I am satisfied that in a great many cases makers have found fault with cans when everything in connection with the factory was not any cleaner than the cans they were complaining about. Now, I see the proper way to do is to start at the factory and keep yourself and surroundings absolutely clean.

There is another matter that was emphasized in Mr. Barr's paper, and that is, attention to small matters, to the details in connection with your everyday work. Now the boxing of cheese is possibly as particular a piece of business as you have to do. A great

many think that if the box does not go within an inch of the top of the cheese, it is all right—that the cover will drop down over it, but when they come to go into a ship, eighteen deep, the cover will drop on to the boxes and the cheese has to squeeze out, and that will possibly injure the sale of that whole shipment because a half a dozen cheese in one hundred were not properly boxed. Another thing that should be insisted upon is a proper box. I have been in Montreal and watched the arrival of cheese that I have shipped in good condition, and I have seen quite a number of the boxes broken. I think we could take a higher position than we have at the present time, provided we see that our boxes are properly made, and by giving attention to this and other small details, we could improve our position.

With regard to the farmer, I think he is the foundation-stone of the business. The man on the farm seems to be behind the times. He does not seem to know which cow has been profitable. I had the pleasure this morning of driving out to Captain Mallory's stable, three miles out of this city, and was delighted with the 12-feet ceiling and the perfect arrangement of his stable. I must say I have not seen as good a stable in a good many years. Everything was in nice order; perfect ventilation, where the cows could breathe the pure air, and where proper food could be given to them; where the animals could see and be seen. I have been in a great many stables where an odor comes from them that is not very desirable. I say it is of the greatest importance that we ventilate our stables. Another way to cheapen the cost of production is to have a silo, so that you may produce milk for half the money for which it is produced at the present time. Feeding hay at eight or ten dollars a ton to a cow is a foolish practice, when you can grow twenty or thirty tons of corn to an acre. You can grow twenty tons easily, and two tons of this corn will make more milk than a ton of hay. By that means you reduce the cost of production over half. I think if we weed out the poor and unprofitable cows, and get our milk to the factories in proper shape, we can exercise our influence as farmers upon the factory, and say to the dairyman that this building is not proper, I will see that it is made the very best that is in this section of the country. If you have two or three little factories, get your people together and see if you cannot have one first class factory properly built I believe steam power is the best power. I believe you can keep a uniform heat, and I believe you can be more economical if you have a proper power. You should have arrangements make for making butter in the winter time. Be prepared so that you can make butter any time of the year if you so desire. I would have it so that I could take Saturday's milk in and skim it and return the skim milk to the farmer. A great many are doing it in eastern Ontario. One boiler and one engine and one maker could handle the whole business that is being done now by three. In that way the most could be got out of the milk for your section.

I believe we have too many factories in the Province of Ontario at the present time. We want fewer factories and larger factories, and better factories, and better educated men to take charge of these factories. See that the makers in your locality go to the Guelph Agricultural College. If they have made fine cheese this year it is of importance that they should go to Guelph and see if there is anything new in the business. As to the branding of cheese, I would say that whatever brand you put on, see that it is put on tidy and nicely and not too large. Do you notice how other manufacturers put up their goods? I would have it so that I could stencil the weight and be sure that the weight is right. Give plenty of weight, so that the Englishmen will know that we are dealing honestly with them; give them sixteen ounces to the pound.

Competition is becoming keener every year. We sent more cheese this year than ever before, and we sent a finer quality. We did better in 1896 than in 1895. In place of sixty-nine thousand packages of butter in 1895, we sent one hundred and sixty-seven thousand packages in 1896, and received $1,000,000 without detriment to anything else in this country. We could easily send $1,000,000 worth of butter more in 1897 than we did in 1896. We should let the world know that we stand on the firmest ground in the world for the production of fancy butter and cheese.

I must thank you for the kindness that I have received from all hands at this Convention. I am delighted that you have accepted the situation of the concentration of the dairy forces in this Province, and have taken hold of the $40,000,000 that Great Britain pays for butter. We have $14,000,000 out of the $22,000,000 she pays for cheese, and it is our business to take hold and see that we have $20,000,000 for butter. I thank you for your kind attentien.

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## MODERN FEEDING IDEAS.

By Ex-Governor W. D. Hoard, Fort Atkinson, Wisconsin.

The mouth is a very ancient institution, and digestion as well as indigestion is fully as ancient. The problem of profitable feeding has also remained unchanged But a great change has been wrought in these latter days in our understanding of the problem.

A flood of light has been thrown by modern chemistry upon the elements of food, and the office of these elements in support of the bodily functions No dairy farmer can afford to be ignorant or indifferent concerning the progress of these ideas. They apply to the very foundation of his success. To be able to intelligently understand feeding questions when they are discussed, we must understand the meaning of the chemical terms which are used in such discussion.

The discussion of this question and the forming of feeding rations in reply to the request of subscribers has become a prominent feature in a few of the agricultural papers of the land. It has been a prominent feature of *Hoard's Dairyman* for the last four years

At the very outset its editors were confronted with the fact that the chemical terms for food elements such as carbohydrates, protein, ash, and also nutritive ratio, etc., were not understood by a large portion of its readers. No other terms could be used. To remedy this difficulty a standing glossary was inserted at the head of this department, which explained as best we could the popular meaning of these scientific terms.

Now, here was a modern situation where modern ideas had to be used to impart the desired information to modern men. The demand for this sort of information is constantly increasing. Dairy farmers are waking up to see that they must learn to feed the dairy cow with a better understanding of what is involved.

Crude and erroneous ideas prevail with a great many as to the true function of food. They think they can feed cheese or butter-fat, or anything they want, into the cow at will. They will hardly believe it when you tell them that the cow cannot change the nature and proportion of the solids in her milk any more than the leopard can change his spots. They think they can take any sort of a cow and bring her to their purpose by feeding. They have not learned the great lesson in dairy practice, that if you wish to increase the proportion of butter-fat in milk you must breed for it and select for it.

So, between a lack of true ideas and a surplus of erroneous ideas, the cow fares badly at their hands. Some men believe but little in the science of feeding. Others believe too much. We will state this question of breed and feed, or what the cow does and what the feed does, as we understand it.

1st. Every cow is born with a certain natural proportion of the milk solids she is to give. That born proportion always exists with her. That is, the casein or cheese part of the milk, the milk sugar and the fat will be in a certain proportion to each other. There is a maximum limit, say of butter-fat, above which she cannot go. It may be three per cent., four per cent., five per cent., or six or seven per cent. Whatever is her born limit there she will stop, and all the feeding in the world will not make her change or exceed this percentage. She may drop below that maximum limit to the lower limit. The maximum and minimum limits of percentage are not far apart. There-

fore it is the part of wisdom for the dairy farmer to establish, first, the breeding of his cow. If he wants butter-fat in large percentage he must breed for it, get a Jersey or Guernsey sire and breed towards enrichment.

Here is a fact which it will be profitable for him to understand. If he is after butter-fat in the largest proportion of profit to cost of feed, the butter-bred cow will give it to him better than any other cow. This is the law of specialized function the world over.

The passenger locomotive will run a hundred miles in a given length of time at less expense in fuel than the freight locomotive. The racehorse will run a mile in 1.40 in a minute at less expense for oats and other feed than any other style of horse because "he is built that way." Indeed no other breed of horses can do the mile in that limit of time.

The highest efficiency in a given direction is obtained by specialized function. The Jersey or Guernsey cow will make a pound of butter at less cost of food than either the Holstein or Ayrshire, because she has been bred to that purpose so long that with her it has become a special function. The Holstein or Ayrshire will yield milk by the quantity at less cost than the Jersey or Guernsey. All of this has been proved over and over again by special experiment, and it is time that every cow farmer in the world knew it for his own profit.

Now, here is where we can see the value of the farmer paying better attention to the breed question. That is the foundation. Breeding is based on heredity. What we want is a cow fitted to our purpose; a cow based on specialized heredity.

When you see a farmer drawing his dairy breeding from a grade or scrub bull, or from one of beef breeding, set it down that the man does not understand the close relation between breed and feed. He is at cross purposes with himself. Convert him from the error of his ways if you can. Sometimes the result will repay the effort. Other times not.

While speaking in a convention in a neighboring state on this question a farmer arose and said: "You may talk what you please about this breed business I tell you the breed is in the corn crib." That is one of those half truths so misleading to many men. I replied by saying; "My friend, if I understand you correctly, your idea is that there is no value in breed, but all the value is in the feed?" "That's about it," he answered. "Well," I replied, "let us see how your theory will work. In my State we used to have a little horse, J. I. C., which would trot a mile in two minutes and ten seconds. He would do this work on twelve quarts of oats. That was the speed product of twelve quarts of oats when fed to J. I. C. Now, I will guarantee that you have horses in your stable that could not trot a mile in seven minutes even if you fed them ten tons of oats." The crowd saw the point at once, but the old farmer turned it off very easily by saying: "You may talk what you please; I believe what I said." As the Hoosier said of the dying horse, "His eyes is sot."

By being obedient to this great principle of individuality, and breeding for it for a long time, men have established specific breeds for specific work, for breeding is only individuality established by heredity. The longer this has been in process the more and fixed is the type, and more certain that "Like will produce like."

You can find thousands of dairymen all over the continent who have taken advantage of this breeding principle. They are making money by it. Others are ignoring it. "Don't believe in it, you know," and they are losing money. "Ideas govern." "As a man thinketh, so is he."

The question of feed applies to the dairy cow just as it applies to the trotting horse. First, the right kind of a horse; then the right sort of feed suitable to support at its best the trotting function.

First, the right kind of a cow—one that will turn her food in the direction of what you want; that will not waste it in some other direction. Then the right kind of food to to support that particular function which produces the special result you want to its best result.

A word or two as to the kind of feed suitable to the dairy cow.

You must feed for milk and all the solids of milk.

You cannot feed for butter-fat alone, for no cow yields butter-fat alone.

What we call protein, or albuminoids, or the nitrogenous element—all these terms meaning the same thing—is a very important portion of the milk. This is the casein or curd. No matter how much you may desire cheese you cannot feed for cheese alone for no cow produces that kind of milk.

What will you do—feed for the whole milk product, and get your excess of butter-fat as a special product by either breeding for it or buying the cow that gives it?

Years of study and observation on the part of patient students of this problem have demonstrated that butter-fat in particular is governed in its production by the action of the nervous system. It is proven also that breeds of cows yielding an excess of fat are specially endowed with nervous force and activity. They have a nervous build, quick nervous motion, are highly organized and of excitable temper. From this it is deduced that this work of producing an excess of butter-fat per 100 pounds of milk makes excessive drafts on the nervous system, and as a logical sequence we must feed a food that is highly nerve and muscle supporting. The protein element has this quality. So while the fat is a carbon, yet if we secure it to the largest advantage we must provide this protein element sufficiently in the food. The foods that most abound in it are first and highest cotton seed meal; then in their respective order oil meal, gluten meal, peas, gluten feed, bran, oats, barley, corn.

The constructing of a dairy ration is based on the calculation of from five and a half to seven pounds of the carbonaceous elements to one pound of the protein or nitrogenous element. But this is by no means an exact science. The temperature governs the proportion a good deal. The colder the climate, the more of the carbonaceous or heat-producing elements we must feed. For this reason cows can be fed an excess of protein, such as cotton seed meal, with greater safety in the South than at the North. The heat elements are not required there so much as the nerve-supporting elements.

Then again the character of the roughage must be considered. All the clovers, vetches, pea vines, blue grass and red top hay are in the order named, of a protein character. Timothy hay, I consider the poorest of all for milk production. I had rather have good well cured corn stalks, ton for ton, and I can get more milk from two tons of good corn ensilage than from a ton of the best timothy hay. The ensilage will cost to produce it $2. The timothy hay $6. This opens to us another profitable field of study: The commercial or market value of feed stuffs. That we must always keep in mind. For instance in my city to-day new corn is worth in the market $4.50 to $5 a ton of ears; timothy hay is worth $8 a ton. There is at least four or five times more value in the corn as a milk feed than in the timothy. But here steps in another principle. The corn must be fed rightly; not too profusely or grossly or you will set your cows to putting on fat and thereby shrink their milking functions. Shrewd business management would dictate to the Wisconsin dairyman that he save his corn and oats, sell all the timothy, except say five pounds a day per cow, and with the money buy bran and oil meal. He will find he can make up for the lack of hay in corn stalks and straw with the oil meal and bran. When you enter upon a consideration of this feeding question you are like a man who threads his way through a forest of big trees. They were there before you were. You can get through if you will take advantage of your eyes and day-light. But if you shut your eyes and go in the dark you will hurt yourself badly. The feeding question is studied with big stubborn principles, the same as is the forest with big trees, and they will not get out of the way for you; big trees and set principles never apologise when you run against them. Let me earnestly advise every dairy farmer in particular to study more and more every year the application of modern feeding ideas to your business of producing milk.

Then, besides, study the question of "breeding" and care of the dairy cow, for those are the foundations on which to base successful feeding. You cannot afford to do

without good books and papers which treat on these questions in a modern way. You are dealing with deep and mysterious forces; you wish to make money by them. You cannot do this alone. You must have the help of your brethren. Get into the current where these ideas exist.

Mr. T. J. DILLON: We have on the platform Mr. Tillson, who has a number of cows in his barn that gave eleven thousand pounds of milk each last year. The average for his herd was eight thousand five hundred pounds. Now I suppose the average milk production for the cows of Ontario would reach four thousand pounds or not one-half of Mr. Tillson's herd of sixty cows, and I will venture the assertion that the average milk of the Province of Ontario is produced at twice the cost that it costs Mr. Tillson to produce his. If Mr. Tillson could produce milk at forty cents a hundred, you can do it if you will. Mr. Tillson has done this by close observation and by practice, and if you will only do the same you can increase your receipts very materially.

Prof. DEAN: The thought occurred to me some time during the summer, why not put up your cheese square in the same shape as we now are putting up our butter? Then you could have a uniform style of packing for both cheese and butter. A local dealer in Guelph has given us an order for a trial shipment to send to London, England. Exporters say it would be a difficult matter to get Englishmen to accept that style of cheese. We used to think it would be difficult to get Englishmen to take Canadian butter in anything less than a fifty pound tub. I think there are several advantages to square cheese, the main one being that you can pack them closer together on the ship. Since we made this square cheese I have heard Mr. McKeon has been at our factory and he ordered a trial shipment to be sent to England. He said it meant a saving of $5 freight on every ton of cheese that they sent to Great Britain. Mr. Lister visited our Dairy school a short time ago, and he said he thought it would pay us to make this kind of cheese. He said cheese was largely used in England by miners and men working at rough work. They put a piece of cheese into their dinner basket or pail. If it has only a rind on one side of it, it breaks up and crumbles and they do not like it. Another advantage in square cheese is in turning it you have six sides to turn your cheese on.

Mr. BALLANTYNE: What about the hooping?

Prof. DEAN: We have no trouble with this as there is no difficulty if the hoop is properly made, and our cheese-maker says there is no more trouble bandaging the square cheese than any other kind.

Moved by Mr. J. H. WOOLEY, seconded by J. HARLEY, that the thanks of the Convention be tendered to the retiring Board of Directors for the able manner in which they have done their business at this, one of the best, conventions we have had in Western Ontario.

The Convention was then closed.

# APPENDIX.

## PROVINCIAL DAIRY SCHOOL CONVENTION.

Following are papers read at a convention of butter and cheese-makers held under the auspices of the Provincial Dairy School at Guelph on March 5th, 1897.

### THE COMMON TAINTS OF MILK—HOW TO DETECT AND HOW TO OVERCOME THEM.

By J. H. Findlay, Guelph.

One of the greatest difficulties our cheese and butter-makers have to contend with is tainted milk. This in a great many cases is due to carelessness on the part of the patron supplying the milk to the cheese factory or creamery; and as the quality of the milk to a great extent determines the quality of the cheese or butter made therefrom, too great stress cannot be laid upon the importance of the careful handling of the milk. Some of the common taints of milk are: Stable odor, cowy flavor, feed flavor and gassy milk. These are caused by dirty and insufficiently ventilated stables, lack of cleanliness in milking, the use of dirty pails, strainers or milk cans, and want of proper aeration, and also from feeding foods which are likely to taint the milk, such as turnips, apples, rape, brewers' grains and frozen cornstalks. Three of the most important factors in connection with the flavor of the milk are feed, cleanliness and aeration. Old stockmen will tell you that "the feed is half the breed," and I would like to say that the feed is "half the flavor," and that cleanliness and aeration are the other half.

It is not a very difficult matter for a factory man who understands his business to detect tainted milk. This can be done by tasting or smelling the milk as soon as the cover is removed from the can after the milk has been delivered at the factory. If the taint is very slight and there be any doubt as to what it is, let him take a sample of the milk in a pail or dipper and heat it to say 120° or higher. If the taint is then more pronounced and is in any way objectionable, or if the milk will not stand the heating, I would say return the milk to the patron and write and tell him of the defect, and also how to remedy it if possible.

Now, just a word to the patron: Keep the stables as clean and as well ventilated as possible. Always see that the pails, strainers, etc., are thoroughly washed and scalded after being used. Brush the cow's udder well before commencing to milk. Be careful with the feeding, never allowing the cow to eat anything that will affect the flavor of the milk, such as apples, rape, turnips, or allow them to drink stagnant water; and last but not least, see that the milk is properly aerated before cooling. This can be done by dipping or pouring the milk from one can to another or by the use of an aerator.

George H. Barr, Sebringville: Nearly all the bad taints are caused by carelessness at the dairy farm. Most of our flavors are caused at the farm. If you are absolutely clean in milking, and aerate immediately after milking, no trouble will be had. Milk should be thoroughly aerated at the time it is milked; after that there is not so much difficulty. Keep in a clean place where a good breeze may blow over it. After the milk comes to the factory I do not think in many instances it is tainted by hog pens. As soon as the milk is turned in steam is applied to it and the taints are rising off; within fifteen minutes after it is at the factory it is giving off odors instead of taking any on. Hog pens I do not think effect milk; whether they effect the cheese in the curing room

I am not prepared to say. Cheese-makers should be careful as to the whey cans. Keep the strainer cloths clean. After reading one of Mr. Harrison's articles last summer I came to the conclusion that it was very important to keep them clean. Aerate for half an hour before cooling. Wash all tinware properly. Gas is often caused by improper washing and it gets into curds. Dirty cans make gassy milk. I would not have the milk waggon between two piles of manure in preparing milk for the factory. I would have milk cans on a waggon and shift the waggon to suit the wind, as it is often changeable, so as to prevent bad odors from coming in contact with the milk when being prepared for the factory.

Dr. MILLS: I do not agree with you in having hog pens around a factory, and I think it would have a bad tendency when cheese is in curd form. About the whey and washings from factory, would you explain that?

Mr. BARR: Our system of having whey and washings taken from factory is very good. The whey and waste water tank is set outside of factory. We send it to the hog pen, three or four hundred yards from factory, by pump logs laid to the hog pens. The waste water is forced through the same set of logs past hog pens into a large trench. From the manner in which we have this drain constructed no flavor has arisen from it so far. We do not make any trench with gravel bottom, and there is scarcely any flavor rises from this. There is never anything around factory to cause smell. The tanks are sunk in the ground about five feet deep. We always take out pipes every fall. Washings from the creamery just run down and on top of ground. In the spring it is not very nice. We use a little lime and find no trouble with smell. I do not think that flavors are taken on the first half hour. It any flavor is in, that is the time to get it out. I think it takes on flavor during the night.

S. R. LEE: In regard to this question of aeration of milk, it seems to me that if everybody would strain the milk before aeration we would have less trouble. I think this is an important point. I interviewed a patron to the effect that he should strain his milk. On the following morning I received a reply through the milk hauler telling me that the patron urged him to tell me that he thought there was plenty of room in his can for the "wee sma' amount of milk he had and the muckle o' dirt too." Cover up cans tight. I have seen patrons do this last summer and I found milk in good condition. If properly strained, aired, cooled and put in close cans, there is little danger of it taking on bad odors. If milk is cooled down without being aired, that is the time it will take on flavor. By covering up you exclude all the bad odors. I think that milk can be aired and cooled down inside of one hour easily. I would put in water and use a thermometer, and see that it was cooled to seventy degrees. Then take out of water. Never leave in water all night. I think the mistake is made in not cooling all at once. That is, do not stir and cool for ten or fifteen minutes and leave it for the same length of time without stirring and then go back to it again. It should be done all at once.

A VOICE: If cooled to seventy or eighty degrees would there be any danger of making it into a starter between that and morning?

Mr. LEE: I do not think it unless weather was very warm. If so, cool a little lower, say fifty degrees F. Always cool milk before aerating it.

Mr. MILLAR, Instructor Dairy School, Guelph: Is that not a mistake when putting in water?

Mr. LEE: Never put in water to save temperature—to cool it down.

Mr. MILLAR: It saves work if milk is thoroughly aired and cooled down; it saves running to it three or four times.

Mr. J. GRAY, Listowel: I do not approve of cooling milk down if thoroughly aerated, unless kept over from Saturday night. If milk is properly aerated and stirred it will keep from that till morning all right without cooling in water.

Mr. DERBYSHIRE: I heard Prof. Dean speak of some system of blowing air into the milk for the purpose of aeration. Where did you get that idea, Prof. Dean?

Prof. Dean, O. A. College: We have an aerator that forces the air into the milk. There is less labor in forcing the air into the milk. It works something in the same manner as a bicycle pump. Mr. G. McKee, Lansdowne, used one in their factory, and said it worked very well indeed.

Mr. Wenger, Ayton: I may say that in the north-western country some years ago people advised churning butter by pumping air into the churn, while the boys smoked and chewed tobacco for three or four hours. The butter came, but the flavor was such that it could not be used. It had odors of tobacco and such like that got into the air when being pumped up.

Mr. Pearce, London: I knew a man in the London district last year who had some process for churning butter. The butter had an oily flavor, received from the machine, which got into the cream. It worked like a bicycle pump.

A Member: I have seen two or three instruments for the purpose of aeration. They served the purpose all right. The difficulty I saw was the amount of labor required. A man had to stand pumping quite a long time in order to make it effective at all, and I do not think they will ever become popular. An aerator to be of use must be something that can be used without a great deal of labor, so that milk can be turned into it and turned directly into the can. Methods requiring much labor I do not think to be of much use.

## THE MANAGEMENT OF A CREAM-GATHERING CREAMERY.

By Mr. A. Wenger, Ayton.

We try to adapt ourselves to circumstances. We have no large herds, as in the older sections of the Province. We are short of modern appliances, and we have no separators, but still with such as we have we do the best we can. We do the best we can under the circumstances, and are able to build up a nice creamery business in the western Province, though we have to cover a large territory to do it.

I manage to do this by having adopted the deep cooling system, in shot-gun cans. Farmers know well what these are. Butter-makers will know shot-gun cans eighteen to twenty inches in depth and eight and a half inches in diameter, with cover on something like a fruit dish, fitting very neatly. After the cow is milked, and milk strained, put into these cans, and submerge in tank of cold water. If water is not cold enough add ice. Break ice up into milk if necessary. Keep the milk as cool as possible twenty to twenty-four hours. Farmers' women themselves skim the cream off and put into can, and submerge in water again. Every second day my team goes around to gather. The cream is put in a pail twelve inches in diameter and measured. The old system was called standards. We test each man's milk. If he has two cans test each can by the oil tube. This tube is nine inches in length and three eighths inch in diameter. Accurate account is kept of each man's cream and test.

I always churn the cream when it is ready even if we have to work the boys until four o'clock in the morning. I want the butter manufactured and put into cold storage as soon as possible, whereas if it was left over a day you would not know whether it was a mixture of butter and cheese in the course of six or seven weeks. We use the best kind of dairy salt we can get, at the rate of three-quarters of an ounce to one ounce to the pound of butter suitable for the market we are making for. Some firms in the old country demand casks of 420 pounds, others square boxes. British Columbia firms want tubs of from fifty to seventy-five pounds. It depends entirely on the merchant you are packing for as to the manner in which you pack your butter.

As to the test, we churn these little tubes of oil in a small churn. If separation is complete there will be three distinct columns, with sharp lines of division between them—a column of fat on top, one of whey next, with casein at the bottom. Cream that gives a reading of 100 in the oil test will make one pound of butter for every inch of such cream in pail twelve inches in diameter.

In regard to the price, I may say that if the Montreal market says nineteen cents a pound for butter, we pay patrons fifteen per pound. If we can get a little more we take it. Montreal is a better market than Toronto.

Be careful to have no bad flavors on the cream. Have patrons particular what they feed to their cows, particularly when the pasture is short. There is no market anxious for turnipy-flavored butter. I put butter into cold storage at about 35° F.

A MEMBER: Would you propose freezing?

Mr. WENGER: My experience does not warrant an answer to that question.

A MEMBER: You prefer 35°

Mr. WENGER: I prefer 32°, because it does not disintegrate the body of the butter. I have tried 32° and have found it to come out in splendid condition. I may say here that I take my cold air down in the wall if I want colder temperature. I have pipes down from the ice chamber. You do not want to keep butter too cool before getting into cold storage. I propose putting one on a refrigerator waggon.

A MEMBER: What kind of salt do you use?

Mr. WENGER: I am using Windsor salt. It suits me all right. Other salt may suit other men. This is good enough for me.

Mr. SPRAGUE: Have you found a great deal of difference in the churning of the different percentages of the oil test?

Mr. WENGER: I do between the different patrons.

Mr. SPRAGUE: What per cent. of cream or what per cent. of oil of sample taken seems to handle best?

Mr. WENGER: Seventy-five to ninety per cent.

Mr. SPRAGUE: Then cream testing from seventy to ninety per cent. gives better results than testing a higher per cent.

Mr. WENGER: Cream set into warm water the first rising of the cream did not get it all. I have better results when cream remains in cold water—about 45° F. In taking a sample for oil test I mix thoroughly before taking. I prefer cream testing seventy-five to eighty. I get better results, and patrons get better results in dollars and cents. I occasionally test buttermilk and usually find from one-tenth to a trace of fat.

Mr. ROGERS, O. A. C.: I think 0.1 is pretty close.

Mr. WENGER: I usually churn at 57° to 58° in fall, and about 60° in winter.

A VOICE: Do you try the buttermilk with the Babcock test after churning at night?

Mr. WENGER: No; I am too busy then with other work.

Mr. FERGUSON, Chesley: Mr. Wenger, how would you answer a man who says sour cream will test more than sweet cream?

Mr. WENGER: I would say that he knew nothing about it. I hear that every day in the year, and I tell them it is simply wrong. There is a certain quantity of fat in cream, no difference whether sour or sweet. If they do not want to fall in with my ideas, the next best thing for them to do is to trade their butter to the grocer for tobacco and molasses. I have a store, too, where I supply them with tobacco.

Mr. ROGERS: I think that the particular cause of the sour cream testing high is because it comes from improperly cooled milk, which gives less cream but more butter-fat.

A MEMBER: I heard a commission man in Montreal say that certain boxes caused butter to mould.

Mr. WENGER: We have not found it so. I cannot see how it could be mouldy if properly lined with paper. In the cases you speak of green wood boxes or tubs may have caused it. Trouble may arise if tubs are not properly seasoned before using. If tubs are seasoned properly I cannot see why butter should become mouldy in the boxes or in the tubs. Have boxes the right size, and be careful in boxing or putting in the tub. It may be necessary to plane boxes down a little, and be sure to have the lids fit properly.

A Member: How much butter do you put in the boxes that you call fifty pound boxes?

Mr. Wenger: I put in fifty and three-quarter pounds.

Mr. Derbyshire: I would have box filled full even if it were sixty pounds, labelling it sixty pounds. Fill box every time or else cut box down. Always put in good weight.

Mr. Wenger: If you label box fifty-seven pounds you would have fifty-seven and three-quarters put in.

Mr. Derbyshire: I would say three-quarters of a pound extra so as to be sure to give sixteen ounces to the pound. Be sure that the butter will hold out in weight.

Mr. Wenger: Add about one per cent. overweight. A couple of years ago my boxes would be sometimes too heavy and sometimes too light. This was carelessness. Since then I have never had any complaints by adding one per cent. extra weight.

## MAKING CHEESE FROM GASSY AND TAINTED MILK.

By J. A. Gray, Listowel.

The handling of gassy and tainted milk so as to produce good cheese therefrom is a very difficult matter indeed. The best thing I know of to do with such milk is to return it. But after a maker has been as careful as it is possible to be, he will find that he has got some gassy and tainted milk in his vats, and when it is there the question is asked, what is the best way of handling such milk? Now, I do not pretend to say that I have the best way of handling such milk, but what I do say is that the method I adopt has given me very good satisfaction. If I can detect a taint or gassy flavor in a vat of milk after it is heated up, I let the milk mature more in the vat before I set it than I would good pure milk. For instance, if I am setting good milk at twenty seconds with the rennet test, and it takes that curd two and one-half hours to dip from the time it is set (which I think is about the right time for a curd to dip), I would lower the rennet test on a gassy curd to sixteen or seventeen seconds, and by doing that you will find that your gassy curd will dip in about the same length of time as your good curds. I give my gassy curds a shade more acid in the whey than curds that show no sign of gas. I dip them when they show a good quarter-inch by the iron test. After dipping the curd I leave it with more moisture than I would a curd that showed no gas. After I have it sufficiently stirred I cover it with a cloth for about ten minutes, after which I use a knife and cut it lengthwise down the centre of the sink and then across in strips of from eight to ten inches wide. They are then turned and left for about ten or fifteen minutes, when they are again turned and placed two deep and kept turned as they require until they are ready for the mill. I, as a rule, mill my gassy and tainted curds a little earlier than I do good curds; usually about one hour and three-quarters from time of dipping.

After the milling I stir them over once. I then spread a sink cloth over the curd and pour on five or six pails of water at a temperature of 105 degrees. The curd is then turned over and five or six pails of water at the same temperature is put on. It is then stirred for two or three times, and then again at intervals as it may be required.

I expect to meet with some opposition on this point of washing curds. You may say, what benefit is derived from washing them? I think it is a good thing for the following reasons: (1) It washes out the sour tainted whey that is in the curd. If you think it does not just taste the washings as they run from the sink and I think you will be convinced. (2) It keeps up the temperature of the curd and causes it to mature more quickly than it otherwise would do if warm water had not been used. The third and most important point is that it produces a better flavored cheese than it otherwise would have been had it not been washed.

Nothing but good, clean, pure water should be used in washing curds. When the curd is thoroughly matured, and the gas holes are flattened out so that when a piece is cut in two with a knife and squeezed between the finger and thumb the holes do not open up,

I then stir it out over the sink and thoroughly air it for twenty or twenty-five minutes before I add the salt. The amount of salt used depends entirely on the amount of moisture in the curd and the season of the year when the cheese are made. A maker has to use his own judgment in this respect.

The gas that I find the most difficult to get rid of is the very fine gas just like pin holes, which sometimes form in a curd after it is milled. I have noticed it a great deal more frequently this last two or three years. What is the cause of the delay of the gas showing itself until this stage I am not prepared to answer. Perhaps some of our professors will be able to throw some light on this subject.

You will notice by this paper that I have not separated the gassy and the tainted milk, but have treated them the same way. As a rule they generally go hand in hand, in fact they may be called twin brothers, and I thought it would be too bad to separate them on this occasion.

Now, if there is anyone in the audience who has got any new or better way of handling gassy or tainted curd than the method I have described, I will be only too glad to hear of it. I have made this paper purposely short so that you may have plenty of time to discuss this question thoroughly, and I am sure there are professors and makers here from whom you can learn a great deal more than you could from any paper that I could give you on this subject.

Mr. R. JOHNSTON: This subject of gassy and tainted milk is one which comes home to us every year and stays with us from three to four months in the season. I would like to ask Mr. Gray the difference in his test from twenty seconds pure milk to sixteen seconds on tainted milk. Will it always come out in the same time or what difference?

Mr. GRAY: I would not like to say.

Mr. JOHNSTON: When you say give one-quarter inch acid, what do you mean by that?

Mr. GRAY: I mean good plump measure; the best way is so much by the rule.

Mr. JOHNSTON: Do you ever pile gassy curds more than two deep?

Mr. GRAY: No, sir.

Mr. JOHNSTON: What advantage would you claim by grinding early?

Mr. GRAY: Gives curds more chance to air, and checks acid more quickly. I usually grind at about two and a half hours.

Mr. DERBYSHIRE: That depends on some sections. Some places it would be all right. Leave curds long enough, so that you are sure you are perfectly right. Man has to use his own judgment. If it takes three and one-half hours he had better take three and one-half hours.

Mr. BARR: Where I am working two and one-half hours would not be long enough; it was generally about three hours. Most of the summer I did not use any at all.

A MEMBER: I think you could work the curd in two hours and a quarter to two hours and a half as hard as in three or three and a half.

A MEMBER: Every cheese-maker has this trouble of gassy and tainted milk to contend with. It gets into our vats and is very troublesome, indeed. I would like to ask Mr. Gray if he uses the same amount of rennet in gassy milk as in good milk before setting?

Mr. GRAY: I use a little more rennet. It should be matured more than usual before salting.

A MEMBER: I have found in using the same amount of rennet in a gassy curd that it remains too long in the whey and gets too hard.

A MEMBER: I would recommend making a rennet test of sixteen seconds; by doing that you have the milk riper.

A MEMBER: I would not recommend washing the curd, and certainly do not approve of that. I pile curd up until it begins to flatten out, and let it stand; then mill and spread out as even as possible; stir occasionally until fit or salting. My opinion is that

two hours and a quarter is about the right time between salting and dipping. I have seen curds handled in other factories the same as in ours and theirs would be three hours. I do not know how it is our curd is of such a hard nature. It takes us in our factory longer than in most of the factories. We use from one-eighth to one-quarter inch of acid. Mr. Bell, of Tavistock, says it is due to some foreign element, that there is too much fibrin in the milk. It is antagonistic to the lactic acid, taking that much longer to overcome it.

A MEMBER: I had some curds last summer which were only fit to gravel the roads with.

Mr. MILLAR: I cannot see the necessity of using water if a man grinds a little finer. It is my opinion that water washes out a certain amount of butter. By using water at 105° F. I have always found quite a waste in butter. Let cheese flatten out pretty well and grind about the usual time of another curd. Pile up for five minutes and I think by airing and stirring you will come out all right. In handling tainted curds I would pile only two deep. There would be no advantage in piling them higher.

A MEMBER: Have you ever any difficulty in using hot iron with gassy curds?

Mr. GRAY: I never use hot iron.

A MEMBER: Did you ever see any difficulty in getting curd to string?

Mr. GRAY: I have seen trouble.

A MEMBER: Did you ever divide a curd and wash one-half and try the other without washing?

Mr. GRAY: No.

A MEMBER: How do you know it would not be as well without washing?

Mr. GRAY: I am certain it would not come along as well.

A MEMBER: It is pretty difficult to tell. If a curd were divided, and wash one half and leave the other half unwashed, and note results. This seems the only way of getting at it, and seeing if there is any benefit derived.

A MEMBER: Did you ever have a gassy curd that was not tainted?

Mr. GRAY: I have had them without any particularly bad flavor. As a rule gassy curd is always tainted.

Mr. MCPHERSON: There is nothing gained by washing, only in connection with the temperature. It has no effect on the curd whatever. The only things that will overcome the gas are lactic acid, heat and moisture. One of the essential things in making a fine cheese is to retain the proper amount of moisture in the curd.

A MEMBER: Would it not be better by putting water in the rack instead of washing the curd?

Mr. GRAY: Yes.

A MEMBER: You must wash these dirty curds, that is the only remedy.

## CURING ROOMS AND CURING CHEESE.

BY W. A. BOTHWELL, HICKSON.

Now, as we are about to launch into another season's manufacture of cheese, and as we have been using all possible means to post ourselves in the latest and most improved methods of making, let us not forget the importance of the curing process, as experts tell us that cheese are only half way to perfection when put on the shelves. Hence the importance of looking after the curing process in a proper manner. I might just here say that a great number of our curing rooms are not fit for that purpose. They are such poor shells of buildings that it is impossible, at any season of the year, to maintain an even temperature. In spring and fall you have the cold to contend with, and in

summer the excessive heat at times. In some districts we are getting good curing rooms erected, but the process of heating those buildings is difficult and irregular, and unless you have some mode of heating that can maintain an even temperature you cannot get good results. You will all agree with me that this is one of the most important points in a good curing room, to have entire control of the temperature. Now if we are to succeed in this business in the future this is one part of the work that must have more attention. And let every cheese-maker see to it in the spring that his curing room is put in the best possible shape it can be. I might just say here if you don't ask for better conditions you will never get them, and in many cases cheese-makers and factory owners have been very careless in this matter, and have suffered more loss through badly cured cheese from cold and overripe cheese in summer from excessive heat than would have fixed their buildings to have avoided loss in either case. In some of our new factories we are getting better appliances to control the temperature in hot spells in summer. Racks are being put in above the shelves for ice in extremely hot weather. I considerit of great importance to have control of the temperature in those hot spells that we are subject to quite often. Makers are all afraid of those sudden hot spells, and quite often get their cheese too firm and hard during that season with fear of having them spoiled with excessive heat if softer. But our buyers are asking more every year for fine soft, fat cheese to suit their customers, that we will have to look after our part of the work and get what they want or go out of the business.

To have your room tidy and in good order inside is very important, as we have been told that losses have been sustained along this line from cheese simply being in a filthy condition from dirty shelves, and cracked and in poor condition from careless workmanship. These are points where a maker is entirely to blame. The curing room should be thoroughly cleaned out in the spring. Before making commences the shelves should be well scrubbed with lye; your room should be well dried out and well aired before you commence to put cheese into it. Then have your cheese all the same size, and be careful in handling them not to get dirt on them in any way. Be sure to have your cap cloths clean, so they will stick to the cheese and avoid cracking under the cloth. Then arrange them neatly on the shelves, putting each vat together, as they are much easier to examine when the buyer comes to see them. Do not roll your cheese on the shelves when soft and green, as you are apt to bruise them when in that condition.

Observing these regulations, and having our goods in the best possible shape, will, I am sure, be a pleasure to ourselves, a profit to our patrons, and a pleasing sight to the buyer who handles our goods, as well as a credit to the great dairy industry to which we all belong.

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## MILK TESTING AND ITS APPLICATIONS.

By J. W. Mitchell, Instructor in Milk Testing, Dairy School, Guelph.

Since the Babcock test and its companion, the lactometer, have, on account of their superiority, almost entirely superseded all other methods of testing milk, it is to these two tests only that we purpose referring in what follows.

We purposely omit in this paper any explanation or description of the Babcock test, as bulletins can be obtained that give full instructions for carrying it on.

Great as has been the light thrown upon, and the consequent revolution wrought in, dairying through the introduction of the Babcock test, yet it is to be regretted that we are not making nearly the use of it that we might, either in our factories or in our dairy herds. It is quite apparent that we have not yet learned fully the value to be derived from its use.

The Babcock test has four important fields of usefulness.

### Detection of Adulterations.

One use of the Babcock test is in the detection of adulterations of milk. For this purpose it should be used in conjunction with the lactometer, as by the use of the two conjointly we are enabled to determine both the nature and the extent of an adulteration. For convenience we speak of skimming, as well as watering, as an adulteration. In every factory it is advisable to have a lactometer, as, besides its use in conjunction with the Babcock test, it is an excellent instrument to use on the weigh stand, being both a ready and a reliable indicator of adulterations, especially in cases of watering. In purchasing such an instrument the Quevenne lactometer is much the preferable kind to buy, as it gives the specific gravity of milk directly, as all rules in connection with milk-testing are based upon the assumption that this is the kind of lactometer used, and as it is a lactometer and thermometer combined—and the temperature of milk has to be taken into consideration in lactometer work.

While we place more reliance upon the Babcock test for the detection of adulterations, yet we strongly advise the use of the two conjointly for this work.

### Payment in Factories According to Quality.

A second use of the Babcock test is in factories where payment is made according to the quality as well as the weight of the milk; and this brings us to a consideration of the chief objections that have been urged to the adoption of this system in cheese factories, and to a consideration of some of the chief points connected with composite sampling and the Babcock testing of milk.

The three principal objections that have been raised to a division of the proceeds in factories according to the quality of the milk are, the extra trouble of taking and keeping composite samples, the extra expense incurred in testing the samples, and that in cheese factories to make a division of the proceeds on the basis of the amount of fat in the milk does an injustice to those patrons supplying milk comparatively poor in butter-fat.

Answering the first objection, I would say that as the introduction of the system of payment according to quality materially improves the quality of the milk supplied to a factory, both by the prevention of fraud and by stimulating the patrons to the putting forth of greater efforts to supply milk of a better quality, it is surely worth the extra trouble that the adoption of the system incurs.

As to the *cost* of composite testing: In a gallon of sulphuric acid there is enough for about 260 tests. Taking the value of the acid to be sixty five cents per gallon, or three and a half cents per pound, the cost of the acid for a single test would be only one-fourth of a cent. In a factory with eighty patrons this would mean an expense of twenty cents for acid each time that the composite samples were tested, or from twenty cents to forty cents per month, according as the monthly or semi-monthly system of testing were adopted. The only other expense of any importance would be for an extra man each day that the samples were tested. Putting this at $1.00, the total cost for the acid and extra help would be from $1 20 to $2.40 per month, or a cost to each patron of from one and one-half cents to three cents per month. Allowing a liberal addition to this of one-quarter cent on each patron, each time of testing, for preservative, breakages, etc., the total monthly cost of the test to each patron would be from one and three-quarter cents to three and one-half cents per month. The *expense* of testing, then, is certainly no valid objection to the introduction of the system.

In answer to the third objection, that the system of payment in cheese factories according to the amount of butter-fat is an erroneous system and does an injustice to the patron supplying milk comparatively poor in fat, we would say that there is an alternative in the adoption of the system advocated by Professor Dean, or what may be termed the "fat-casein" system—that is the system of adding two to the per cent. of fat as a consideration for the casein in the milk. To take a specific case, let us suppose that two patrons supply equal quantities of milk to a factory during a certain

time, the one milk having an average (Babcock test) of three per cent, and the other four per cent and that the sum of $77 is to be divided between them. Then, while under the butter-fat system the first patron would receive $33 and the second $44, they would, under the fat-casein system, receive respectively $35 and $42—that is, under the fat-casein system the money would be more evenly divided between them. This method has been proven by a large number of experiments here to correspond very closely with the actual yield of cheese.

These objections disposed of, we would, first, briefly outline the system of composite testing, and then note some of the important points in composite sampling and the Babcock testing of milk.

In the system of composite testing, a bottle is labelled and set apart for each patron. Into the bottle set apart for any one patron is put a small sample of milk from that delivered by him at each time of delivery. To prevent the sample from souring some kind of a preservative is used—bichromate of potash and corrosive sublimate being the most common. At the end of two weeks or a month this composite sample is tested; and if every precaution has been taken to obtain proper samples from the weigh can, and in making a Babcock test of the composite sample, this will give the average quality of the milk supplied by the patron during the time over which the test extends.

### Points Connected with Composite Sampling and Babcock Testing.

1. For holding composite samples, a bottle with a long cork is preferable. The bottle should never be left uncorked, as the sample will dry on the surface, and a tough skin, composed largely of cream, will be formed.

2. Over the labels on the composite test-bottles put a good coating of shellac with a brush and no trouble from the labels coming off when washing the bottles need be feared. Try this if you have not done so already; you will be well pleased with the results.

3. Each time when beginning anew to take composite samples be sure to add the preservative to the bottles previously to putting any milk into them. This is a point often neglected.

An excellent preservative is a mixture of bichromate of potash and corrosive sublimate, seven parts of the former to one of the latter. A little less than what can be taken on a ten cent piece, of the mixture, will usually be found sufficient to preserve samples for two weeks in the summer time, when an ounce dipper of milk is added to the sample daily. Sometimes it will be found necessary to add a little extra of the preservative to the samples later on. The best guide on this point is the color of a sample and how well it is keeping.

4. Always pour the milk from the patron's can into the weighing can and have it well mixed before taking a sample to put into the composite test-bottle. While dwelling upon the great importance of obtaining a proper sample of milk from the weighing can, I would like to emphasize the necessity of guarding against taking a sample from the unfrozen portion of a can of milk that is partly frozen and then crediting the patron with the weight of both the frozen and the unfrozen portion. Either melt the ice and have the milk well mixed before taking a sample or else just weigh and sample the unfrozen part, allowing the patron to retain the frozen portion. We tested several samples of the frozen portion of milk here this winter, and in every case the per cent. of fat was very low. The poorest sample contained only eight (.8) of one per cent of fat—which was no richer than the skim-milk in the average farm dairy.

5. Upon adding a sample of milk to the composite test-bottle be sure to rotate the bottle gently to incorporate the new with the old; but avoid shaking the bottle, as this tends to churn the sample.

6 In preparing a composite sample for a Babcock test of it, first set it in warm water to loosen the fat from the walls of the bottle; then, as with any sample of milk, mix well by pouring from one vessel to another—never by shaking.

7. A sample of thick milk can, by the addition of a little powdered concentrated lye—Gillet's lye—to it, be broken up and prepared for testing.

8. Always make sure that your pipettes and test bottles are clean before using. A strong solution of concentrated lye is excellent for washing test-bottles.

9. Measure the milk for a Babcock test very accurately and blow the pipette out well. Remember that the test, while very reliable, is as delicate as it is reliable, and requires to be very carefully conducted throughout to insure accurate results. Only by careful and accurate work can factorymen hope to establish and maintain the popularity of the test with their patrons.

10. An excess of bichromate of potash in a composite sample has a strong tendency to give rise to burnt readings. The difficulty, in such cases, can usually be overcome by the use of less acid in testing. I have, before now, found it necessary to use only about two-thirds the usual amount of acid with such samples to obtain a satisfactory reading.

11. In Babcock testing, perhaps one of the points most frequently and most generally neglected is attention to temperatures. The bad effects of inattention to temperatures are greatly underestimated. Sulphuric acid acts more powerfully upon milk that is at a high temperature than upon milk at a lower temperature, and charred or burnt readings are often due to the milk being at too high a temperature when the acid is added, while light colored readings are due to the milk or acid being at too low a temperature. Adopt some *constant* temperature at which to have the milk when the acid is added. A few trial tests will teach you how much acid to use with the milk at the temperature chosen. Set each test-bottle in water at the right temperature after putting the milk into it; this will save cooling the large sample. Especially is this necessary with composite samples, as the milk is always somewhat heated from setting the bottles in warm water to loosen the cream from the sides of the bottle. By the time that the last test-bottle is filled, the first will have reached the right temperature for adding the acid. Also some constant temperature should be adopted for the water for setting the test bottles into before taking readings, as the higher the temperature the more the fat will expand and the greater the reading will be. For factory work I would suggest the following temperatures: About 70° for the milk when the acid is added, about 140° for the water added to the test-bottles, and between 130° and 140° for the water into which the test-bottles are set before a reading is taken. If you prefer different temperatures from those suggested, adopt them, but do not neglect to adopt *constant* temperatures.

12. When testing in a cold room, it is very necessary to put hot water into the testing machine to keep up the temperature.

### Testing of the By-Products.

A third use of the Babcock test is in testing the skim-milk, buttermilk and whey, to ascertain whether there is any avoidable loss of butter-fat in these by-products or not. This should be practiced daily in every factory.

A loss of an unnecessary tenth of one per cent. in the skim-milk—a seemingly very trifling loss—means a loss of nearly a pound of butter-fat in every 1,000 pounds of milk; or in a creamery receiving 10,000 pounds of milk daily, this would mean a loss of about ten pounds of butter-fat per day, and at twenty cents per pound for the fat this would mean a loss of $2 per day, or $60 per month. We are apt to overlook these so-called minor points, and to forget that one of the greatest ways of increasing our profits is by diminishing our losses. The time has come in dairying when we must stop up these small leaks.

I would say, while dwelling upon the importance in dairying of testing the by-products, that our factorymen could assist materially in the establishing of winter creameries by asking for samples of skim-milk from the farm dairies, testing them, and showing the great loss of butter fat in the skim-milk, and thereby demonstrating to the farmers one of the several advantages to be gained by co-operative winter as well as summer dairying. Mr Rogers, of the dairy department, did a good work along this line during the past year in collecting samples of skim-milk from the various farm dairies

about here and showing that in the average home dairy there is a loss of about one-fourth of the butter-fat in the skim-milk. My own experiments, though not so extensive, quite agree with this.

For testing skim-milk, etc., we would recommend the use of special skim-milk bottles, and prefer a bottle with a neck of small bore or diameter, as the scale is thereby greatly lengthened and very small and very accurate readings can thus be taken.

A larger amount of acid can be used with skim-milk than with whole milk, although, unlike the experiments at the Wisconsin Dairy Station, ours have not led us to conclude that it is essential to use an extra amount.

### Babcock Test in the Dairy Herd.

A fourth use for the Babcock test, and one of the most important, though one of the most neglected, is on the farm. Every dairy farmer should weigh and test the milk of each individual cow in his herd often enough to ascertain her value to him for dairy purposes.

The time was when we could better afford to be more charitable towards unprofitable cows—and let me say that in this respect the dairy farmers exercise an unwonted degree of charity. But with the low prices that now prevail, and promise to continue, for dairy products, the producer must endeavor to increase his profits by lowering the cost of production and raising the standard of the cows in our dairy herds as one great means to the accomplishment of this end.

How are the dairy farmers to be taught the great value of the Babcock test in weeding and raising the standard of their herds, and to be led thereby to look upon it as an essential factor of successful dairy farming? This can be done only through our cheese and butter-makers. In order to demonstrate its importance and value to his patrons it would seem necessary for the maker to begin by asking his patrons for samples of milk to be tested from the different cows in their herds. Of course the maker could not afford to do too much of this kind of work gratis, as it would mean a considerable expense for acid, etc., for testing, and would also consume a considerable portion of his time. However, he would find it necessary to start in this way, and once he had gained their interest and had taught them the accuracy of the test and its value to them, a different course could then be pursued. The patrons could then pay the maker for testing for them—say from five to ten cents for each cow for the season. At ten cents for each cow, this would mean a cost to the patron of $1 for each ten cows for the season. In this way the maker would receive fair remuneration for his services, and the patron would be, many times over, repaid; for how could he spend a dollar more profitably upon ten cows in his herd than in ascertaining the exact value of each cow to him? It would be wise for the cheese or butter-maker to do the testing at as cheap a rate as he could well afford to. Certain times could be appointed for testing for each patron, and the patron could begin saving a composite sample from each cow's milk a few days previous to each time of testing.

If some such a system as that just indicated were generally adopted throughout the Province, what a source of revelation it would be to the great majority of the dairy farmers; how many worthless cows would be disposed of; and what an increase there would be in the annual exports of cheese and butter from the Province; and how much greater would be the profits, as a consequence, accruing to the dairy farmers!

No cow should be kept for dairy purposes that will not produce at least 250 lbs. of butter or 600 lbs. of cheese per annum.

In concluding this paper I would specially urge upon every factoryman the importance of becoming thoroughly proficient in Babcock testing, thereby winning his own and his patron's confidence in the test. I would ask him to consider the importance and advantages, both to the patrons and to himself, of its more general adoption in factories and in testing the cows in the dairy. And, lastly, I would ask him not to forget his important position in the matter and his consequent responsibility for the non-introduction of the test as an important factor in dairying in his community.

## BUTTER-MAKING.

By S. G. McKee, Lansdowne.

The subject given me is certainly very broad, and will admit of a great deal of careful study if success is to be attained in the end.

The idea is quite commonly held that if the milk is simply *not sour* when it gets to the creamery it is all right, and of course the butter-maker can get along with it all right; but such ideas are entirely wrong, as the article that is manufactured will certainly be injured by the bad milk.

I have found that by heating the milk, before putting it through the separators, to a temperature of 106° such foul flavors as arise from feeding turnips, bad potatoes and bad ensilage, can be completely overcome, and thus leave a cream free from any foul flavor.

Then comes a still more delicate point, that of caring for the cream and preparing it for the churn, and still being sure to preserve that delicate flavor which is the greatest essential in the manufacture of the finest creamery butter. I do not think that any butter-maker, no matter how good a man he may be, can get the very best results in flavor on his cream unless his vats are thoroughly scalded after having been thoroughly washed, and if he uses a starter, the greatest of care should be exercised in the selection of one that has a nice mild, sweet flavor, as the butter will become possessor of every good flavor the starter may contain and likewise every bad flavor the starter may contain. Hence a great deal of care is required in procuring a good starter. I would suggest a *perfect sample of buttermilk*, and the only way I find to secure this is to be very careful and particular in the beginning, and just keep right on so and all will end well.

Then comes the churning. I thoroughly scald my churn first, then thoroughly cool it, after which I proceed to put in my cream, to which I add a little butter color to secure the desired shade. This seems of little importance, but great care is necessary to get a June shade in winter butter, and what can be more unpleasant to the eye than to see a box or tub of butter either red or nearly white.

After I have made sure that the temperature of my cream in the churn is not more than 57° in summer and 61° in winter, I start my churn, which I make sure is not running less than from fifty to fifty-five revolutions per minute. This I continue till the butter breaks and comes to about the size of small shot, when I stop my churn and draw off the buttermilk, allowing it to drain about fifteen minutes. I then add pure water at a temperature of from 48° to 50° and a quantity equal to the buttermilk just drawn from the churn. I then close my lids and revolve the churn slowly for six turns, when I stop it and draw the water off immediately, as before, and allow the butter to drain for about fifteen minutes. Then, while the butter is in a granular form, I distribute my salt over it, at the rate of 1 oz. to every pound of butter, thus making sure that every granule gets its portion of salt. I then revolve the churn very slowly for about a minute and a half, when I proceed to remove the butter from the churn and place it in my storeroom, to remain for from one and a half to two hours. Then I put the butter on the worker again, and work it till I get the grain right and the color uniform, when I proceed to dispose of the butter in whatever style of package most required. This process I find gives splendid satisfaction, and, though there is a good deal of work about it, it will more than pay to be thorough, and above all to have everything you work with, and the building in which you work, and lastly the maker himself, particularly clean.

Mr. Stonehouse: It would have been a little more satisfactory if Mr. McKee had been here to answer questions. There are some questions I would like to have had answered, and which might have helped on the discussion. Why allow buttermilk to drain fifteen minutes? I cannot see any advantage in that. You might just as well hasten it out with water as allow it to stand fifteen minutes. The temperatures are rather high at 57° to 61°—57° in summer and 61° in winter. Our temperatures here run from 50° in summer to 55° and 56° in winter. I would like to know how to revolve the churn slightly. It is pretty hard work when you have a churn ten feet long holding 600 to 650 pounds. It would be pretty hard work to turn it.

A MEMBER: We revolve the churn as Mr. McKee mentions. We can revolve about 300 pounds of butter at once. We use a 500 gallon square churn ten feet long.

ANOTHER MEMBER: You might be able to revolve 300 pounds, but when you get 600 to 700 I do not think you would be able to do it.

A MEMBER: Do you advise to salt in churn if you have much butter?

A. I do not think that it makes any difference at all if the butter is in the right condition. It is less trouble to salt in the churn.

Mr. STONEHOUSE: I had a wooden fork while at the dairy here last winter, and I asked Mr. Roger's leave to take it home to try it. We had no trouble in working the fork in our churn. We regulate the amount of salt by the pounds of milk required to make one pound of butter. When salting it is absolutely necessary to use judgment.

A MEMBER: Are there any grubs in salt?

Mr. STONEHOUSE: It may be something new. I saw grubs in salt last summer. I had considerable trouble with three barrels of salt. I sent a sample here to Prof. Panton and got his opinion. He said they did not belong to the salt at all, but got into the salt in some manner, likely while in vessels containing fruit. I took and cleaned everything away and the trouble ended. These grubs were about three-eighths of an inch in length. There is another point I wish to speak of, that is in finishing the packages for the market, which I consider to be a very important thing. When I was at Toronto Exhibition last fall I paid particular attention to the finish of a good many of the tubs that were there, and was greatly surprised at the style in which they were finished. I never took as much interest before as I did last fall. One thing in particular that made me pay more attention was correspondence I had last fall with Mr. Alexander in connection with butter for export. He spoke particularly about the finish of the packages which were sent. He said if he could get all his butter put up in that way, properly finished and the butter all right, he would have no trouble in obtaining good prices.

A MEMBER: You spoke of the butter you saw at Toronto. Would you please tell us how you finish your own?

Mr. STONEHOUSE: I have a stick made for the purpose of levelling off. It works simply by turning round and round.

Mr. EDGAR: One point that has not been touched on which I practiced last summer, and one which is very important—it is in preparing the churn. I have steam connection by which I can steam churn thoroughly and then cool. It does away with all kinds of bad flavors. I get the steam into the churn by steam pipes I steam for about twenty minutes.

A MEMBER: Would not the work-room be filled with steam?

Mr. STONEHOUSE: Our churn room is in the cellar; very little steam escapes. We do not turn in a large amount, but keep up heating for twenty minutes.

Mr. ROGERS: Would you steam immediately before putting in cream?

Mr. STONEHOUSE: I would allow it to cool down.

Mr. ROGERS: Better to steam after you are done butter-making and clean it up then.

Mr. STONEHOUSE: Well, that is all right; but I like to do it as short a time as possible before putting the cream in. It does not give any time for germs to develop. The churn is cleaned out thoroughly, and aired after being through with it every day, and steamed in addition to that. We cool by adding water after steam is put in.

A MEMBER: Some object to heating the churn at all.

Mr. STONEHOUSE: It may not be necessary every day. I think it is well to repeat once a week at any rate.

A MEMBER: Would it not be better to steam for a shorter length of time? What is the object in turning on for twenty minutes?

Mr. STONEHOUSE. I do not think it would be. You want to take time to do it properly.

## PASTEURIZING CREAM.

By T. C. Rogers, Guelph.

Pasteurizing cream in the dairy or creamery means a process of heating the cream to about 160° F. by the application of hot water surrounding the vessel holding the cream. Its object is to remove undesirable or offensive odors in the cream that would cause objectionable flavors in the butter, whether these flavors be caused by the food the cows eat, growth of bacteria, lack of cleanliness or want of aeration.

Pasteurization was first discovered by a French chemist, named Louis Pasteur, and was made use of by him in 1868 to prevent fermentation in beer and wine. Its importance as a means of improving the keeping quality of milk and cream was not generally recognized until a few years ago, but the method is now growing rapidly in favor as a means of freeing cream or milk from germ life for commercial purposes. Many progressive dairymen are adopting this method to free milk from taints and to improve its keeping quality, and also to remove the danger of diseases before offering it for sale in cities and towns.

The boards of health in some of the largest cities are now studying this process and its beneficial effects, and are considering the advisability of introducing this method of purifying the milk for city trade in order to improve its keeping quality and to guard and protect the health of the people.

The Danes, who are acknowledged by some to be the most scientific butter-makers, are introducing this method in their creameries to improve the quality of their butter, so as to maintain the reputation they have in the British market. They have, by studying flavor and by putting their butter on the market while fresh, secured a larger percentage of the import trade in butter of the English people than any other nation. We, in this country, are waking up to the importance of putting our butter on the market while fresh, but we must give close attention to its flavor in order to suit the tastes of the foreign market. We should be ready to adopt the most improved systems of manufacturing so as to secure a uniform good flavor and keeping quality in our butter.

We have made great advances recently in our methods of butter-making, through the system of instruction given in our creameries, dairy schools, travelling dairy, dairy journals, and on the public platforms. But we must do better, and make our butter more uniform in flavor before we may look for a very large increase in our export trade.

We have the climate, soil, water and all natural advantages to make butter equal to that of any other nation, and all we need to do is to get the flavor right in order to capture a large portion of the butter trade in England as we have done with our cheese.

This uniform good flavor can only be brought about by co-operation in the creamery, or in other words by the farmers uniting in the production of good milk, and having their butter made in the creamery, and the butter-makers uniting in the adoption of the most improved system that will give the butter a good uniform flavor from day to day and in all the creameries alike. It is well known that a large quantity of milk is received at creameries so tainted from various sources that it is impossible to make butter having a good uniform flavor from day to day. The skilful butter-maker can do much to control the flavor of the butter by the use of a well prepared starter in the ripening of the cream. But if the milk is badly tainted with turnips, or filled with kinds of bacteria that produce bad odors, then the starter will be almost powerless to control the flavor of the butter.

The right kinds of lactic acid germs will develop a mild, pleasant flavor in the butter; but there are kinds or species that develop a strong disagreeable flavor, and will control the flavor of the butter in spite of the butter-maker's skill. It is the latter kind that we are unable to cope with when a few cans of milk impregnated with these germs are received on the same day into the creamery. Here the ordinary process of butter-making fails to control the flavors. But when we introduce a system of pasteurizing the cream while sweet and before ripening it, we get control and almost entirely remove and prevent all bad flavors caused by bad food and water, dirt and microbes.

I am not aware that this process has been adopted in this country or the United States in butter-making further than in an experimental way. No doubt it is because of a want of knowledge as to how to make it practical with cheap and common appliances, without the purchasing of costly machinery, that the process has not been adopted before now.

During the last year we conducted a number of experiments to test the quality of the butter made from pasteurized cream and learned that the flavor was mild, uniform and sweet to the taste and had good keeping qualities. The texture was all that could be desired. It scored up among the highest marks obtained by any of our experimental butter for the season.

At the opening of our present Dairy School term we saw that there was not much improvement in the quality of the milk compared with former years, so we decided at once to pasteurize all the cream before it was put into the cream vat to be ripened.

The results have been most satisfactory. We have not had a single complaint about the flavor since the school opened, and the demand is increasing at top prices. We have confidence in the process, and believe from the beneficial effects noticeable in the butter and from the lively interest the students have taken in it, that pasteurizing, as a means to overcome bad flavors, will be adopted in many creameries in the near future.

The apparatus we use to pasteurize is so simple and practical that any creamery where there is trouble with the flavor of the butter can adopt the process with a very little outlay of money.

A creamery, having two separators, would need ten cannon shotgun cans and three or four small wire handled dippers to stir the cream while heating and a hot water tank, or barrel, eighteen inches deep inside, with steam connected to heat the water. This is all the apparatus required to pasteurize the cream as fast as separated.

The barrel should be large enough to hold three or four cans at the same time, and if cut down to eighteen inches in depth there will be less danger of water getting into the cream, and the cans will be easier lifted in and out. The water should be heated to the point where the steam ceases to make a noise, and no higher, as the cream takes a cooked flavor if the water in the tank is near boiling temperature. Steam should be let into the water all the time to keep it just below the boiling temperature, at 180° or 190°. This will avoid a cooked flavor in the cream, the cans will be easier to wash and the cream will be heated quickly.

The cream should be stirred constantly while heating to 160°, then removed from the water and emptied into the cream vat.

In this way we have pasteurized the cream from 5,000 lbs. milk in fifty minutes. The cooling of the cream may commence as soon as the first cream is emptied into the vat. In this way separating, pasteurizing and cooling may be going on at the same time, and this prevents unnecessary delay. As soon as all the cream is cooled to 95° add the required amount of "starter"—say from twelve to twenty-five pounds to each 1,000 lbs. milk separated—varying the quantities of starter according to the season of the year and the time allowed for the cream to ripen.

In some factories some person may have to be employed to come to the factory to stir the cream while it is being heated, but in most factories the work can be arranged so that one person can attend to the cream for the short time the separators are running, or perhaps a better way to save time would be to wait until four cans are filled with cream and then heat all together at the same time, which would take about five to eight minutes. About the time another four cans are filled the pasteurized cream would be ready to empty into the vat. The intelligent, observing butter-maker will, with a little practice, find a quick and practical way to do the work.

We have introduced in the School another system of pasteurizing, which appears to meet the requirements and is giving good satisfaction so far. The apparatus used costs about the same as the other appliances already described, and saves the labor of stirring the cream while heating. It is a channel vat, eighteen inches wide, thirty-six inches long and three and a half inches deep, with eight channels in the bottom. By means of these channels the cream is compelled to run eight times the length of the pan and rises to the depth of two and a half inches before it reaches the overflow or outlet. This pan is set in another pan the same width and depth but two inches longer. The bottom pan holds the water, which is heated by a coil of perforated steam pipes. Very little steam is required to keep the water at 180° to 190° F. and do the work of pasteurizing. This pan can be set on a table or bench under the separator cream spout. We have a tin cover over the pan to exclude the cold air from the surface of the cream while heating. I am confident that the introduction of this process will have a beneficial effect on the flavor of our Canadian butter, and would be the best system to adopt to make it uniform in flavor. If we get our flavor right our butter will be superior to most of the butter going into the British market.

This process, along with quick transport and the cold storage system, would put our butter on the English market in such a condition as to command the highest prices, and would secure for Canada an outlet for all the good butter we can make for some years to come.

Let there be a willingness among the butter-makers throughout the whole land to give the pasteurizing process a fair test, that knowledge may be gained and our country receive the benefit therefrom.

Dr. Mills: I want to know if the flavor of your butter is injured by heating to a temperature of 160° F. This process certainly kills many germs, but should this be done for five, ten, or twenty minutes. I know it takes more than ten minutes to kill certain forms of germs. If the heating of milk to a certain temperature kills these germs, it is also important to know whether the flavor is injured or not.

A Member: I do not think heating would have any effect on the flavor, still I do not think this is practised to a very large extent.

Mr. Rogers: Ever since the Dairy School opened this winter we have pasteurized the milk, and know that it takes away all bad odors. I believe that cream tainted with turnips would be freed from the taint.

A Member: So far as the quality of butter is concerned by heating I do not think the flavor of the butter is injured as long as the right kind of starter is used. The Danes, who produce a fine quality of butter, pasteurize their cream.

A Member: What about souring cream?

Mr. Rogers: I tried souring cream and pasteurizing. It seemed to make cream grainy, just like curd getting hard. It was not affected in any other way. The butter was not the same if pasteurized before it got sour. It did not appear to be as smooth and nice as other butter.

Dr. Mills: Heating cream up to 160° F. will kill all germs.

Mr. Rogers: We do not claim that pasteurizing improves the flavor where it is already good, but it will remove bad odors from the cream.

A Member: In Mr. McKee's paper he says revolve the churn from fifty to fifty-five revolutions per minute. Mr. Rogers, I think, says from seventy to eighty.

Mr. Rogers: I refer to the Danish churn. It will also depend on the diameter of the churn. A churn with a large diameter will run slower than one with a smaller diameter.

Mr. Derbyshire: One of the best methods is to get all the milk pure at all seasons of the year. Never let up on that. Get the milk perfectly pure to the factory, and keep it right, and then you will have little need for pasteurizing. If you cannot get the milk in that condition then pasteurize.

# THE CHEMISTRY OF MILK WITH PARTICULAR ATTENTION TO THE RELATIONS BETWEEN MILK-FAT, CASEIN AND YIELD OF CHEESE.

By A. E. Shuttleworth, B. A. Sc., Professor of Chemistry O. A. C., Guelph.

A question that was asked in past ages, is still only partly answered, and, for ages to come cannot, in its entirety, be answered, is this: Of what are things composed? Attempts to answer (and attempts never cease), may be classed either as scientific or as unscientific. The scientific, are characterized by the use of the chemical balance; the unscientific, by what is called the speculative method. During the time of the speculative method, much of what might be designated as chemical knowledge accumulated; but the science of chemistry remained undeveloped—yea, worse, it was unknown. It is not easy to state just when the subject of chemistry began to emerge from that of mere knowledge into that of a distinct science; but the date 1770 is commonly referred to as the beginning of the science of chemistry. Previous to that, it was generally believed that boiling a sample of water for a time transformed it into earth This erroneous impression was made upon the minds of chemical workers by the common observation that whenever water is boiled for a time in a glass vessel a deposit of earthy matter is formed. This question, which to-day appears a remarkably easy one to solve, remained for years undisputed for the simple reason that any amount of speculation, a purely mental process, could neither prove nor disprove it. By the use of the chemical balance, however, in the hands of the eminent French chemist, Lavoisier, this earthy deposit was shown to weigh an amount exactly equal to the loss in weight of the glass vessel; and, further, it was shown that the water weighed exactly as much after as before boiling. These facts lead the scientific investigator to a correct conclusion. This was one of the first scientific chemical investigations ever made.

It is not surprising then that in those days of unscientific research strange ideas were held regarding the composition of common things. Even as late as 1538, an eminent writer of that date discussed at considerable length the then all-important question as to whether milk was composed of the element heat, cold or moisture. Even in 1619 only four parts were recognized in milk, viz., butter, curd, whey, and a sulphur principle. The whey was regarded as a form of quicksilver; the butter, as a form of sulphur, and the cheese, as a form of salt. During the early part of the eighteenth century, Boerhave, who laid the foundation of animal chemistry, was the first to recognize milk as the most perfect food. He examined it in a variety of ways, viz., by the action of acids upon it, from which he concluded that by the addition of any acid milk curdles; by distillation, from which he concluded that milk contains no spirits; by dropping a portion into the eye, from which he concluded, since no pain was experienced, that milk contains no salt. Enough has been said to indicate the ignorance once prevailing regarding the composition of milk, the crudeness of the methods by which even the leading chemists endeavored to determine its composition, and the often almost ridiculous conclusions drawn.

Imperfect, however, as the chemical work of the ancients may appear to chemists of the present age, it was a beginning from which has developed, gradually, through centuries, a great number of students of chemistry now almost perfectly equipped with appliances and aided by the most delicate methods of investigation. Take for example, Kjeldahl's method with appliances for the determination of nitrogen, now so perfect that the percentage of casein in milk or cheese can be ascertained with absolute accuracy to the second decimal place. As a natural consequence of the recent growth in chemical science, much has been, and will be, learned regarding the composition of natural and artificial products. The science of chemistry, therefore, of recent years is intimately associated with nearly every industry. This thought brings me to a consideration of chemical investigations that have had an important bearing upon the cheese industry.

Particularly within the last twenty years, there has been a keen desire on the part of progressive dairymen to improve the quality of the dairy products, milk, butter and cheese. This desire was not simply to gratify a fancy; it was the outcome of a clear

perception that there was a steady increasing demand, in all the markets, for an improvement in the quality of dairy as well as other products for human consumption. In a word, the signs of the times taught men of observation and of judgment to strive earnestly, intelligently and vigorously for quality to maintain for their products a place in the markets of the world. Working towards this end, writers, instructors and lecturers in dairy subjects filled the entire atmosphere with the sense of the necessity for a better cow, a warmer, cleaner stable, cleaner and better drink and food dry, clean-handed milkers, etc. From the very beginning of the production of the dainty, tasty product throughout the entire course of its manufacture to its final destination upon the table of its consumer, improvement is the watchword. Experience has proved this course right, and for many years to come there must be no relaxation.

It is very natural, in response to this universal dairy stimulus, that there should be a demand for improvement in the quality of milk. Numerous methods for the estimation of fat in milk have been proposed during the past few years; but, for a time, it appeared that there was no practicable method for use where it was most needed, *i. e.*, among practical dairymen in creameries and factories. Here, where a large number of tests must be made, economy of time and money and simplicity of manipulation must be combined with accuracy. Dr. S. M. Babcock's new method for the estimation of fat in milk, given to the public in July, 1890, appeared to combine all these necessary requirements, viz., economy, simplicity and accuracy. The inventor's "hope that it may benefit some who are striving to improve their stock and enable creameries to avoid the evils of the present system" was speedily realized.

The evils of the present system referred to above existed also in cheese factories. A difficulty, however, presents itself in avoiding these evils in cheese factories. The constituent of milk known by the name casein, which constitutes a large part of cheese, does not admit of easy estimation. By a chemical process, however, in the hands of a chemist, involving considerable time and expense, it can be done with a remarkable degree of accuracy. Dr. Van Slyke, Chemist, New York Agricultural Experiment Station, Geneva, New York, was lead by his investigations relating to the manufacture of cheese, to advocate the use, in cheese factories, of Dr. Babcock's new method for the estimation of fat in milk. It has, during the last two or three years, been introduced into many cheese factories both in Canada and the United States. This is a step in the right direction, and the time is coming when Dr. Babcock's tester will find a place in every factory probably throughout the length and breadth of the land. The ground upon which Dr. Van Slyke unhesitatingly recommends its use in cheese factories is, undoubtedly, his firm belief that the relation of fat to casein in mixed factory milk is sufficiently constant to make fat alone an accurate guide in regard to the amount of cheese that can be made from milk. He says: "Two, and only two, compounds of milk influence and concern the production of cheese, so far as the composition of milk is concerned. These two cheese-producing constituents of milk are fat and casein. The other constituents of the milk, such as albumen, sugar, etc., pass into the whey for the most part and are lost, so far as the cheese is concerned. The question may be raised that the cheese contains water in addition to fat and casein. The amount of water retained in cheese is quite independent of the amount of water in the milk from which the cheese is made, since the amount of water that is retained in cheese is dependent upon the conditions of manufacture, and the cheese-maker has it in his power to retain more or less water in the cheese. Therefore, we need to consider, in this connection, only the fat and the casein of the milk as the cheese producing constituents of the milk."

Remembering the importance of casein, as well as fat, in determining the cheese yield of milk with other important facts, viz, that there is no practicable method for making a direct determination of casein in factories, that the fat basis is much the fairer and clearly preferable to that of weight of milk only, that numerous analyses, made chiefly at the Geneva station, showed about two-thirds of casein for each pound of fat in milk, it appears perfectly clear that the Babcock tester can render valuable service in cheese factories as well as in creameries.

It must not be forgotten, however, that in most instances improvements come gradually. The introduction into cheese factories of the fat basis is a great improvement on the old method of paying for milk. But the method as introduced, while fairer and clearly preferable to the old method, is not so absolutely faultless that it is above criticism.

There appears to me no doubt that the fat basis was a step in the right direction. The question now to be considered is whether a modification of the fat basis should be made; however, such a consideration must not be regarded as an attack upon the fat basis. At this point attention might be called to the fact that during the cheese-making seasons of 1894 and 1895, while Prof. Dean was conducting his cheese experiments, now familiar to you all, we made in the chemical department a careful and rather extensive study of the relation between butter-fat and casein by exact gravimetric analysis of the milk upon which Prof. Dean experimented in the dairy department. Details of this work have already appeared in the annual reports of 1894 and 1895. The chief facts brought out may be mentioned.

In 1894, for each of the seven months, we found less casein to each pound of fat in the rich than in the medium milk; and, taking Prof. Dean's yields of cheese and our determination of fat, we found also less cheese to each pound of fat in the rich than in medium milk. The averages for the entire season of 1894 are, in 3.248 per cent. milk, one pound butter-fat to .66 of a pound of casein, and in 3.890 per cent milk, one pound butter-fat to .59 of a pound of casein. The difference in the yield of cheese to each pound of fat is .24, practically one-quarter of a pound. We found, taking all results, a relative increase of 0.23 of a pound of casein for each increase in fat of .1 of a pound.

During the following seasons the investigation was continued upon the same line but the analysis covered a great many more samples of milk. In addition to those taken from our home dairy, samples were also taken from two neighboring cheese factories. The results in every particular confirmed those of the previous season. The season's averages gave, in 3.215 per cent. milk, .74 of a pound of casein and 2.783 pounds of cheese, and, in 4.093 per cent. milk, .62 of a pound of casein and 2.497 pound of cheese to each pound of butter-fat. The difference in the yield of cheese to each pound of fat for the second season was .28. We found a relative increase of .021 of a pound of casein for each increase in fat of .1 of a pound. In this connection it may also be mentioned that the relation of fat to casein in the milk of individual cows was studied during the last season. Here also the same fact is borne out, viz, that casein in milk tends to increase when the fat increases, and decrease when the fat decreases, and that for every increase or decrease of .1 of a per cent. in fat there is a corresponding increase or decrease in casein of between 02 and .03 of a per cent. Dr. Van Slyke, during the season of 1895, conducted a valuable and extensive investigation quite similar to this, the results of which I have just given.

Our investigation in the chemical department was chiefly upon the milk of one herd of cows, two samples of milk being secured upon each of three days every week, making six samples a week, while Dr. Van Slyke's investigation was upon the milk of fifty herds, samples being taken once from each herd every alternate week. In these two investigations, made on different years in two distinctly different places, and quite independently of each other, there is an exceedingly interesting variation of the same experiment.

To what extent do our results and Dr. Van Slyke's agree? Dr. Van Slyke found an increase of .1 per cent. of fat accompanied by an increase of .024 per cent. of casein. We found for the same amount of increase in fat .023 in 1894, and in 1895, in the milk of the whole herd, 021, and in the milk of individual cows, between 02 and .03. He also found by the same investigation .25 of a pound of cheese less to one pound of fat in a 4 per cent. milk than in a 3 per cent. milk. We found for the same amount of fat, in 1894, .24, and, in 1895, .28 of a pound of cheese less from the rich than from the medium milks. There is, then, an almost exact agreement between these results. Practical dairymen may now ask what, then, are your conclusions? My reply is this; The relative

quality of the cheese from rich and from medium milk, as compared or estimated by the respective prices they command in the open markets, must determine whether the milk-fat as a basis is sufficiently fair to all who together furnish milk to a cheese-factory. Chemical science can determine the relation between fat and casein in milk, between fat in milk and yield of cheese; but it cannot fix prices for which cheese will sell or for which milk can be purchased.

If the quality of cheese thus estimated pronounces the milk-fat basis a little too severe upon the less fortunate patron, then the milk-fat basis may be modified, not displaced; and the modification, if it does come will, undoubtedly, be based upon the relation of casein to fat in milk. The addition of two to the fat-reading does not recognize that casein increases when fat increases, and, therefore, in a 3 per cent. milk allows payment for nearly all the casein contained, while in a 5 per cent. milk allows payment for only 74 per cent. of it. If the production of a better quality of milk is to be encouraged, but if the milk-fat basis, unmodified, is too liberal to the patron who furnishes rich milk to be fair to him who furnishes even medium milk, then the modification should have exactly the opposite effect, viz, to allow payment for all the casein in the rich milk and for only a certain portion of it in the poor milk. It has been advanced in support of the justice of adding two to the fat reading of milks of all degrees of richness that the loss of fat and casein in whey increases with increasing richness of milk. But we have found by our extensive analyses of whey that there is contained a higher percentage of fat and casein of the total fat and casein of the milk in the whey from the medium than in the whey from the richer milk. Similar conclusions have been reached in several of the leading American experiment stations.

# CREAMERIES' ASSOCIATION OF ONTARIO.

## TWELFTH ANNUAL MEETING.

The Twelfth Annual Convention of the Creameries' Association of Ontario was held in the town of St. Marys, on January 13th, 14th and 15th, 1897. The sessions were held in the town hall, except that on the second evening, which took place in the opera house. On the latter occasion, music interspersed the speeches. The audiences were large throughout the Convention. During their stay, the freedom of the town was formally conferred upon the members of the Association, in an address presented by His Worship, Mayor Dunseith.

### PRESIDENT'S ADDRESS.

By D. Derbyshire, Brockville.

On Wednesday morning, the President, Mr. D. Derbyshire, Brockville, opened the Convention at 10 o'clock with the following address:

It is with pleasure that we meet with the citizens of St. Marys and vicinity. I thank the leading merchants, manufacturers and business men for the kind treatment accorded me a few weeks ago when making final arrangements here for holding this Convention. We have secured some of the most eminent instructors in dairying in the United States and Canada to address this meeting, so we anticipate a very profitable time and trust all will be benefited.

Besides holding our annual Convention at Cornwall in January, 1896, the President and other members of the Creameries' Association have addressed a large number of meetings in various sections of the Province, and we believe much good will result from our efforts in educating our farmers to go more heartily into dairying, to keep only profitable cows—weeding out the poor and unprofitable servants; growing corn, building silos, and building good stables, where their stock can be kept comfortably. Our various meetings have been well attended and great interest manifested. We had a special meeting at the Dairy School, Guelph, under the auspices of the Western Dairy Association and the Creameries' Association, for butter and cheese-makers, which was largely attended, with good results.

I have visited the Kingston Dairy School several times, and addressed the butter and cheese-makers, encouraging them to qualify themselves to take a leading place in their profession.

The Hon. John Dryden has proved himself an ideal Minister of Agriculture, assisting the various dairy associations in every way possible, attending our annual meetings, increasing our grants, thus encouraging us and enabling us to do better work. He established the best dairy school on the continent for the proper training of butter and cheese-makers at Guelph, and, later on, one for Eastern Ontario, at Kingston. I do hope all will avail themselves of this generous provision on the part of the Ontario Government.

I also visited the National Butter and Cheese Association at Cedar Rapids, Iowa, and gathered all the new ideas possible.

Prof. Robertson has done splendid service this last year, addressing a large number of meetings, giving timely advice and sending two experts, Mr. Pierson and Mr. Zufelt, to educate new winter creameries to make finest goods.

The Hon. Mr. Fisher has promised refrigerator cars and apartments on steamships for placing our creamery butter on the British market safely, speedily and cheaply, so that we can easily take possession of that market.

Our exports of creamery butter have more than doubled again this year over last.

Our instructor, Mr. Sprague, has done splendid service, visiting all our creameries and giving practical instructions, and we feel that the special instruction given to new creameries this year has been of great importance. A large number of these have been established, and, from the character of the buildings and improved apparatus put in, we feel greatly encouraged for the future. He commenced work the last of March and continued till the middle of December, 1896, doing nearly twice the work ever done by this Association before.

We have also made great advancement in the quality of our creamery butter, which was fully proven by the excellent exhibit of this product at the Industrial Exhibition of 1896.

In 1886 the Creameries' Association was formed. At that time our butter was a reproach to every citizen in Ontario, because the farmers who had large dairies and could make good butter were patronizing our cheese factories. Through the holding of conventions, and the dissemination of useful and apt information in its reports, attending special meetings through the Province, sending our instructor to every man desiring assistance, and even to some who did not ask but were known to be making poor goods without style, we have done a great work. We have fostered the creamery business in the summer and directed dairymen to the advantages to be gained by adding the manufacture of butter during the winter. We have one hundred regular creameries in Ontario, and one hundred and fifty winter creameries running now. Every member of our Association is enthusiastic in the work. With the educational work that has been carried on by us, the other dairy associations see plainly that there is no conflict between butter and cheese, but, on the contrary, our work is one—that of building up our great dairy industry—and before many years no April or November cheese will be made in this fair Province, but the April, November and December milk will be manufactured into fancy creamery butter.

The encouragement afforded last year by the butter market has been more than repeated this season, and the results have been highly gratifying. If care is exercised there is no reason why next season's exports should not be almost trebled, as they have this. To date, 15th November, since the 1st of May, 157,321 packages of Canadian creamery butter were sent to Great Britain, against 69 000 in 1895 and 32,000 in 1894. During the past three years, therefore, the increase in exports show that our creamery butter has at last established a reputation for itself in England. The returns to the farmer from butter represent almost $1,890 000 against $853,384 in 1895. This increase of over $1,000,000 is certainly remarkable. Yet our shipments this year are only a drop in the bucket when considered alongside the $40 000,000 worth that Great Britain annually imports. We have plenty of margin yet for expansion. Our average price of eighteen cents is certainly low, but we must expect low prices. Our farmers are not reducing the cost of production. If we could only get them to select a dairy cow, or as Gov. Hoard would say, a business cow, and furnish her with large quantities of cheap food, exactly intended for making milk economically, and kindly treated in favorable quarters, we would reduce the cost of production fully twenty-five per cent at once, and by following business methods closely, selecting, weeding out, keeping only the most profitable, we would soon find our farmers making money again, without getting higher prices or lowering the price for manufacturing.

Then the production of more milk of a better quality and at less cost must be kept constantly before our dairymen as an indispensable requirement for the future. A longer milking period for cows is also a necessity. A cow cannot earn a living in six

months no more than a man can. She will be a better cow and give better results when milked ten months, if properly fed and cared for. Let us resolve, as dairymen of this favored land, that we will take another step in advance in 1897—that we will take stock at least once a year and find out exactly how we stand. Do not make any ordinary butter at home; be sure and take your milk in summer to some well-equipped butter or cheese factory, and to a winter creamery after the first of November in each year. Our markets are loaded to day with ordinary cull butter worth from eight to ten cents which injures the sale of all, while fancy creamery butter is scarce and dear. If I could only arouse our dairymen everywhere to keep only dairy cows; to grow twice the corn; to build a larger silo; to feed liberally a balanced ration; to take all their milk to a creamery or cheese factory; to be energetic and watchful, our business would soon flourish again.

As you are aware, a meeting of the delegates from the Creameries' Association and the Eastern and Western Ontario Dairymen's Associations was held in the office of Mr. Henry Wade, in the Parliament Buildings, to discuss Hon. Mr. Dryden's proposal for the amalgamation of the three organizations.

After careful consideration of the whole question with the Hon. Mr. Dryden, it was resolved:

"That the three associations as now existing be amalgamated into two new associations, to be called the Butter and Cheese Associations of Eastern and Western Ontario, respectively, with an executive committee composed of three representatives from each association to act as a central advisory board."

I do sincerely hope all our creamerymen will enter into this new arrangement heartily and do all in their power to make the new organizations successful.

## COMMITTEES.

The President named the following committees, his suggestion, on motion, being adopted:

*Business.*—C. Richardson, St. Marys; A. Campbell, Ormond; W. G. Walton, Hamilton.

*Finance.*—A. Wenger, Ayton; Jno. Sprague, Ameliasburg; Wm. Hallidav, Chesley.

## DISCUSSION UPON THE PRESIDENT'S ADDRESS.

Mr. JOHN LEGGE, being asked to discuss some of the points raised in the address, endorsed what the President had said in favor of fixing the cows' milking habits the first season, weeding out the poor milkers and so improving the milking breed. Referring to the stress which the President had put upon corn for feeding cows, Mr. Legge described it as the "sheet anchor" for any kind of stock, but he believed in roots too, and had fed them ever since he had a farm. He found the more corn they had the more they had of everything else. He had no silo, and was not sure whether ensilage was the best form in which to feed corn. There was a great deal of acid developed in the ensilage, and though the cattle liked it he had an idea that as it took on acid it lost feeding value. He saw no objection to the creamery system of making butter. On the contrary, by co-operation in this way they would be able to produce the right article for the British market. He did not think, however, it would be well to pay attention exclusively to dairying in that section. They had grown a good deal of wheat in the past, but the President seemed to think they would have to stop doing so.

The PRESIDENT: Not if you keep your soil in good condition.

Mr CHARLES BEARD said he had two silos, having commenced making ensilage four years ago. This year he sowed a great deal of corn so as to be sure of having plenty.

I think, he continued, a great deal of the silo, but I do not go so far as to say we could not feed corn profitably without it, although I do not think you can feed corn in any better way to save labor.

A MEMBER: Will it not go further when fed dry?

Mr. BEARD: You can store it away, but it seems to me it loses a great deal of value.

The PRESIDENT: Then, if it is fed dry, do you not lose a great deal in the stalks which are wasted?

Mr. LEGGE: I believe there is a loss in that respect. When the corn is put in the silo the cattle eat it up cleaner. However, when corn is properly saved there is very little wasted. I do not go in for western corn; it is too bulky.

Mr. BEARD: I have generally sowed corn that matures early—Mammoth Southern Sweet, Compton's Early, e c. We also tried the Mammoth Cuban, but did not get the results we expected. I would not like to give up the roots entirely for ensilage, though it is a fine thing; but I would give up the roots rather than the ensilage.

The PRESIDENT: The reason we do not grow the same proportion of roots east as you do west is that they give us more trouble. We can raise corn and put it in the silo easier, and we think it is a good deal better and costs about half the money. The reason we build a silo is that we can store a greater quantity of food in that way than in any other, and keep it in exactly the condition it was in when stored and feed it in a green state. There is as much comparison between ensilage and field-cured corn as there is between a nice green apple, which is palateable at this time of the year, and a dried apple. Then you get the best results from the silo. If a man uses a silo to the best advantage he need not turn his attention to any other business in this country than farming.

Mr. VERNON, in response to requests for his opinion, said: I built a silo last fall. It was rather late in the season, and from what experience I have had thus far I am well satisfied that it is the best way of keeping corn. My reasons are these: I cut some of my corn before I had made up my mind to build a silo. It was cut about 1st September in as good condition almost as it would be possible to cut corn. Then what I put in the silo was cut a little later on and was caught by frost. I am satisfied, however, that the corn I put in the silo, though damaged on account of the frost, is the preferable food. The cattle like it better and it produces more milk. The kernels on the stalks of the cured corn are shrivelled up, and those in the silo are as plump as when I put the corn in.

The PRESIDENT: The corn in a silo is the nearest approach we can get to June grass, which is the natural food for dairy cattle. What we want to do is to give the cattle that food in the winter season which most nearly approaches June grass, and that is ensilage made of corn that has been well matured before cutting. Then you will have the proper food. No man will ever go back on a silo when he knows what it will do for him.

Mr. VERNON, in answer to a question, said he had two kinds of corn, viz, Mammoth Southern Sweet and Early Whitecap. The latter matured much earlier than the Mammoth Southern Sweet, but there was more acid in it.

Mr. LEGGE: I am not an enemy to the silo, and I would be glad to see that there was a better and cheaper way of handling corn than in bulk. I have been handling it for a long time, and I notice that those who are most enthusiastic about the silo are those who have not had much to do with corn before they tried the silo. I feed roots, as I said, but this year I am feeding more corn than before and the cows are doing well on it.

THE PRESIDENT: As Mr. Vernon said, the corn needs to be mature. It should be planted early in the spring on rich soil, so that you get a quick growth. Then, do not be afraid to stir up the dirt and make a rapid growth, so that the crop will mature before frost. It is the cultivation which makes it grow, and cultivation is only preparing the land for another crop of something else next year. Intense cultivation of the soil is wanted. It ought to be cultivated on the top. With us the farmers have a very

light harrow for the purpose. Run this harrow caterwise across the drills, killing the weeds and stirring up the dirt before the corn is up at all. The next time cultivate caterwise the other way. Then when the corn gets so high that you cannot run the harrow over it any longer, continue to cultivate between the drills, and keep the cultivator going steadily all summer until the corn gets so high that it drives you out. In planting drop a kernel every eight or ten inches in drills three or three and one-half feet apart. Leave plenty of room for the sun to strike the roots—it is the sunlight you need. It wraps itself right about these stalks in the summer and then expands in the cow in the winter.

## THE FOOD COST OF A POUND OF BUTTER.

By Prof. H. H. Dean, Agricultural College, Guelph.

I have first to discuss with you what I consider one of the most important problems before us as butter producers to-day. Now, in saying this I do not refer merely to the man who is at the churn or at the butter market, but I refer also to the man who produces the milk to make the butter. In fact he is the most important factor in connection with this whole dairy business, as I shall try to show you in a few moments. When butter was selling at 23, 24 and 25 cents a pound it was not so essential that we should consider how much it cost us to produce a pound of butter, but when the price comes down to 18 cents, as it has this winter, it is very important that we should consider the cost of production. I find that it costs about 2 cents a pound for supplies and the labor of making one pound of butter; 1 cent a pound for freight and commission, and it cost us about 14 cents per pound for the food during 1896; or in other words over seventy-five per cent. of the ultimate price received for a pound of butter is connected with the cost of the food required to produce that butter. We, as dairymen, should know when we sell a pound of butter, what part is expended in the different operations.

Now, there are several important factions which enter into this question—the man, the cow and the feed. The food cost of a pound of butter depends upon the man who is doing the feeding; upon the cow to which the food is given; upon the kind of food, whether suited for milk production or not; upon the care and treatment which accompanies the food; upon the milker—a poor milker may easily increase the food cost of the butter; upon the man who handles the milk; an ignorant, unskilful person who wastes or spoils a portion of the butter given by the cow, adds to the food cost of that which is saved or well made; and, finally, upon the man who markets the finished product. It will be noticed in the foregoing that the "man" enters into this problem five times, the "cow" once and the "food" once. Therefore, five times as much care should be given to the "man" as to either of the other two factors.

There is one other factor which enters into the problem, viz., an economical use of the by-products (skim milk and buttermilk) in butter-making. By using these to the very best advantage in feeding calves and hogs the food cost of a pound of butter may be considerably lessened, because each item of "save" and revenue lessens the cost of production.

A noted political economist (Faucett) says: "The price of any manufactured commodity cannot permanently to any considerable extent either exceed or fall short of its cost of production." If this statement be true the cost of producing a pound of butter must have stayed somewhere near the cost of production for a long time. But when we consider that the price of a pound varies all the way from 10 cents to 100 cents, and if the proposition be true, there must also be a wide range in the cost of production. Very few, if any, dairymen know what it costs them to feed their cows, or what their cows produce in the form of butter during the year.

During the past year the dairy department at the Ontario Agricultural College has been weighing the feed, weighing the milk and testing the milk for each cow in the

herd. The highest yield of butter from one cow was 424 pounds, the lowest 120, and the average 244 pounds per cow. The highest average food cost of one pound of butter for an individual cow was 22.2 cents, the lowest 8.8 cents, and the average 13 9 cents. The cows butter that cost 22.2 cents per pound to produce it made a loss of $2.69 on the food fed her when her butter was sold at twenty cents per pound. The cow that made butter out of food at a cost of 8.8 cents made a profit of $47.30 by selling her butter at twenty cents per pound. We are aiming to make all our cows give a profit of at least $35 per cow after deducting cost of food. The by-products and manure ought to about balance the labor bill.

### The Cost by Months.

The food cost of the butter by months is shown in the following table:

| Month. | Number cows milking. | Food cost of 1 lb. butter. |
|---|---|---|
| | | c. |
| December, 1895 | 16 | 18.8 |
| January, 1896 | 16 | 14.0 |
| February, " | 15 | 12.3 |
| March, " | 17 | 13 6 |
| April, " | 18 | 10.4 |
| May, " | 17 | 6.7 |
| June, " | 21 | 4.2 |
| July, " | 22 | 8.3 |
| August, " | 24 | 12.6 |
| September, " | 21 | 17.3 |
| October, " | 22 | 15.3 |
| November, " | 20 | 12.5 |
| Average for year | 19 | 12.1 |

It will be seen that the most economical months for the production of butter were May, June and July. During these months the cows were charged with pasture at $1 per month for half of May and the other two months. While the pasture was good little else was fed to them. These results indicate that the man who is making butter and trading it out at the country store for 12 to 15 cents per pound is not making very much profit out of his cows, though I believe that farmers may feed more cheaply than we can where everything is bought or charged at market prices. Our average cost of a pound of butter by months from all cows that were milking was 12 1 cents. When we include also the cost of the food during the time that the cows were dry it brings the average food cost up to 13 9 cents. We hope to improve on this during 1897. It can be done by getting better cows and by paying more attention to the food and care. In the meantime we would like to impress this thought upon all dairymen: endeavor to ascertain what it costs to feed each cow in the herd and at the same time know what she is doing at the milk pail and in butter. If the milk and butter do not pay for feed and labor, you and the cow had better dissolve partnership.

Mr. Legge: You did not tell the original cost of the cows?

Prof. Dean: No; I am discussing the food cost only.

Mr. Legge: That would affect the cost of the butter?

Prof. Dean: Yes.

Prof. Dean continued: Now, closely connected with this important problem of feeding cows profitably is that of making as few wastes as possible.

## The Raising, Ripening and Churning of Cream.

*Raising Cream.*—There are three common methods of raising cream, or, to use a more correct phrase, of creaming milk, the small shallow pan, the deep setting or creamer system, and the centrifugal separator. All three have conditions under which they will be best suited to the dairymen, but all do not always give the best and most satisfactory results. There is undoubtedly a great waste of butter in the skim milk as obtained on the average Canadian farm. Samples taken from thirty six dairies in the vicinity of Guelph during April, May, July and September, showed average loss of about one pound of butter per 100 pounds of skim milk where the shallow pan and deep cans were used. One dairy used a cream separator and the loss was less than one quarter of a pound of butter per 100 pounds of skim milk in four samples taken at different times. We have also found that it is more difficult to cream cows' milk where the cows have been milking for some time—six months and over—by using cans set in ice water.

For winter creaming of milk with the separator we find it an advantage to heat the milk up to about 100° to 130° before separating. The separator will skim more closely; it will skim more milk per hour and the cream is of better flavor when the milk is heated.

If the milk is not heated it will be found an advantage to pasteurize the cream. The flavor of the butter will be improved by heating the cream.

*Ripening Cream.*—Experiments have been made at the dairy department of the Ontario Agricultural College in order to determine the best temperature at which to ripen the cream. A quantity of cream was equally divided into three lots. One lot was ripened at 75°, another at 60°, and another was cooled to 48° for one hour then warmed to 60° and ripened at that temperature. There was not much difference in the quality of the butter made. The flavor in each scored 42.2, 42.9 and 42.8 respectively. The "grain" was nearly alike in all.

"Pure cultures" made from Hansen's "Lactic Ferment" from "B. 41" when added to cream did not give any better flavored butter than cream ripened by the use of a home-made "starter" when the skim milk was pasteurized. In cases where creameries or dairies have difficulty in securing a good flavored "starter" it might be well to try these "pure cultures" in order to get a start. The score in flavor of butter made from these cultures was 41.8 for Hansen's, 41.8 for "B. 41," and 42.8 from home-made starter.

Butter made from cream testing about 18 per cent fat, had a higher flavor soon after being made than did butter made from cream testing 28 per cent. fat, but it did not hold its flavor so well.

To test the acidity of cream we prefer a clear alkaline solution to Farrington's alkaline tablets. These tablets are often broken when received; they are considerable trouble to dissolve; they lose strength after being dissolved. When added to the cream, the solution being somewhat the same shade as is the permanent pink color which the cream assumes when the acid is all neutralized, it is sometimes difficult to tell when the proper amount of alkali has been added. Our cream usually has from five to seven-tenths of a per cent. of acid in it at churning.

Experiments made during the past season indicate that an advanced period of lactation (over six months) did not materially affect the flavor and grain of the butter. The cows in the dairy stable were divided into three lots—fresh milkers, over two months and under six, and those over six months milking (one cow in the latter group had been milking over two years). The average score in flavor was 41.8 for fresh milkers' butter, 40.9 under six months and 41.7 over six months.

Butter unwashed scored an average of 38.3 in flavor, washed once scored 40.2 and washed twice scored 40.4. For a quick market wash slightly or not at all, as we can thus secure a higher flavor. Where butter is to be kept for some time more washing will be necessary. Five packages of butter were sent to D. Derbyshire & Co. on June

29th. They consisted of two packages of unwashed butter, two of washed once and one washed twice. One package scored 100 points. It was made April 4th and was unwashed. On July 3rd three other lots were sent to the same firm to be scored. The unwashed again scored 100 points, washed once ninety-nine, and washed twice ninety-six.

Experiments made with salt showed that butter salted seven-eighths ounce and over per pound of butter, scored an average of 39.3 points in flavor when kept for one to four months in an ordinary cool room. Similar butter when salted one-half ounce and under per pound of butter averaged 37.2 points out of forty-five in flavor when kept the same length of time and under similar conditions to the heavier salted butter. The export trade demands butter salted lightly. To have such butter reach the consumer in good condition it will be necessary to ship promptly after it is made and keep it at low temperatures.

Mr. LEGGE: Was the warming of the cream to which you referred for ripening purposes? You said something about different temperatures of cream.

Prof. DEAN: We found that there was not much difference between ripening to 60° or 75°, but that it was a little better at 60°.

Mr. LEGGE: I have heard about producing butter in Devonshire from cream sweetened by a scalding process.

Prof. DEAN: That is simply what we call pasteurizing. It improves the quality of the butter.

Mr. CROIL: What temperature do you churn at?

Prof. DEAN: We churn at 53° now. Sometimes in the summer we get down as low as 43°.

A MEMBER: Do you feed turnips?

Prof. DEAN: No; I do not think they should be fed if you want a fine quality of butter. Here I may say that you may get the most of the turnip flavor out of cream by pasteurizing it before churning.

A MEMBER: If your herd consists of different breeds of cows it would make the cream more difficult to separate, would it not?

Prof DEAN: I do not think so, with the cream separator. It would where you are setting the milk.

If a butter-maker is not sure when his cream is properly ripened how is he going to find out? He will take out of his cream vat a small quantity (20 c.c.) of cream and put it into a teacup or glass and add what is known as "phenol," which has the peculiar property of changing the cream to a pink color when you add alkali until the acid is neutralized. When the cream contains about six-tenths of a per cent. of acid it is about ripe for churning, and this process will tell you what per cent. of acid has developed in your cream.

Mr. CROIL: What system do you have for heating the cream?

Prof. DEAN: We heat the milk in a small vat until it is heated to the proper temperature for separating—from 95° to 100°. The cream is afterwards heated to 150° in shot gun cans placed in a hot water bath. After allowing the cream to stand for twenty minutes at this temperature it is put in a narrow cream vat with a six-inch water space all around it. Here the cream is cooled to 95°, and ten to fifteen per cent of starter is added. It is then cooled to 65° and allowed to stand at that temperature until it thickens, when it is cooled gradually through the night to churning temperature (52° to 53°). By this system we are able to get a uniformly good flavor day after day. This plan drives off many taints, such as stable and turnips, and we consider it the best plan for winter butter making that we have ever tried. A continuous heater or pasteurizer would save a great deal of labor. We used such a machine combined with a cooler for creamery work, though the narrow vats have given excellent satisfaction with us. These vats are about one foot wide.

A MEMBER: Some cows do not pay. Will you give us an idea of what is the most profitable kind of cow to keep?

Prof. DEAN: Any cow that will make 250 pounds of butter or over a year if she is fed economically will pay.

A MEMBER: What breed of cow will make the most butter?

Prof. DEAN: If I were a private individual I would have no hesitation in answering. The Jerseys and Guernseys have produced a pound of butter more cheaply than other breeds That was the result of the tests at the Chicago Fair. There is just as much in the individual cows as in the breeds. Because a man has a Jersey cow it does not follow that she is a good cow.

A MEMBER: Which is the more important, the animal or the feed?

Prof. DEAN: They are both important. I would not like to say which is the more important.

A MEMBER: Would you say something about the Babcock test?

Prof. DEAN: I may say that all these results were obtained by weighing each cow's milk night and morning and putting samples of it in bottles on a shelf labelled with each cow's name, which at the end of the week were taken to the dairy and tested with the Babcock tester; and I do not think any man who has a dozen cows can afford to be without a Babcock tester. I think if a cow's milk were tested once or twice a month you would have a pretty fair idea of what she was doing. We can surely afford to take the time to find out whether the cows are making money or running us into debt.

Mr. WRIGHT: There is one class of people who should not have a Babcock test, that is those who are selling milk around the towns. (Laughter.)

A MEMBER: When do you put the cows to service?

Prof. DEAN: The second most profitable cow in our herd this year is one that has not dropped a calf since two years ago last October. It is just a question whether we should breed cows so often as we do. But I think the average Canadian cows would have to freshen about once a year or they would not give much milk, because when a cow has been accustomed to milking only six months at a time you have to breed her if you are going to keep her at all. It might be better to breed cows only every two or three years.

A MEMBER: Where are we going to get our calves?

Prof. Dean: Buy them from a man who breeds more frequently.

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## DAIRY IDEAS.

By HON. W. D. HOARD, FORT ATKINSON, WIS.

EX-GOVERNOR HOARD said: Amid the great, marvellous ocean of ideas, I am only able to select a few. I have been a student of this question—intensely so—for forty years and more. It is forty-five years ago since I first commenced to be a butter and cheese maker, and I feel a good deal as Isaac Newton did when he came to die—that he had been simply playing like a boy upon the shores of knowledge, picking up a pebble now and then, may be of rarer utility, but still the great ocean of truth lay unexplored before him. It is so with this question. As I approach it, it pains me exceedingly to think how little I know of all that should be known; and it pains me a great deal more to see how many men there are who are not pained at all. (Laughter.) Contentment is a good thing, but when it produces that condition of affairs in men of absolute indifference to their knowledge and progress, it is not a good thing.

Now, you are dealing with the cow, and she is a wonderful embodiment of mystery, because she deals with the great question of life. She is a mother, and whether it is the Queen of England, or the queen of my dairy, it is not a whit different; the mystery of

maternity is just as great in my cow as it is in the highest woman on earth. It is the question of maternity, and, wonderful as is the mystery of life, so wonderful in its variableness is the action of milk.

I have jotted down a few ideas, to talk about in a somewhat rambling way this afternoon. There are thousands of men who will give a gelding horse better feed, a cleaner stable and better care than they will give a motherly cow that is absolutely earning a larger net profit every year. What is it that so prevails among the farmers of this continent as to cause them to be so indifferent to the lessons of wisdom concerning this cow is a mystery to me.

The law of individuality is a wonderful law, and you have to deal with it in your cow. You hear men talking about breed, and someone will ask, "what is breed?" It would be a splendid thing if we would be true philosophers along this pathway of dairying and stop to question terms, to ask what is the meaning of this term, and what does that term mean? What is the meaning of the word breed? It simply means that a certain individuality has been taken hold of and manipulated, enlarged and developed until it becomes a breed characteristic. It is a law of individuality worked out; a law of individuality seen in the difference in the breeds of cows and horses. One horse will travel twice as far on the same food as another will. Why is it? What makes the difference in these horses? It is also seen in the pig pen or in the young calf. What is it that creates this wonderful difference of individuality? There is the same characteristic of breed in plant life. In my cornfield I tried four times the experiment of planting all the kernels on an ear of corn from butt to tip, ten inches apart I wanted to ascertain whether there was any difference in the vitality of the kernels according to their position on the cob. I found weak stalks everywhere on the cob. There was a law of individuality in the corn corresponding with each individual kernel. There is the same law governing the pig in the pen that will not thrive; and the law of individuality in the horse which will travel so much further than another on a given quantity of food. Everywhere among animate life we find this law. Where individuality is so strong as to mark the traits of offspring we call it "potency." All there is to the difference of breeds is the conveyance through potency of a strong individuality. In this way breeds and families in breeds are established by increasing and strengthening certain individualities which become valuable in breeds. For instance, with the Jersey cow, she was taken, away back over a hundred years ago, and from some few mothers which proved their ability to give very rich milk a start was made, and so they have gone on increasing this trait until to-day the Jersey cow is so powerfully potent in that one direction that she puts a larger percentage of butter-fat into the milk out of the same food than any other breed of cattle. The Holstein cow, raised upon the moist, luxuriant pastures of Holland, with a great deal of water in the food, has been bred along the line of quantity, and with the same care in the matter of breeding and feeding they have produced this marvellously great milk animal. It becomes, therefore, highly important to the average farmer to study the external signs of this super-potent power in both sire and mother. When you are looking for a breeding animal, one of the most important things to secure is a potent animal which will take possession of the current of the female and breed the offspring according to the ruling traits which are in him, and which you want. As a rule the strong tempered males are the most potent. It is largely a mental characteristic.

### What a Man can do with a Herd of Cows in Twelve Years.

I am particularly interested in the man who produces the milk. The creamery men can take care of themselves. They are all the time ahead of the farmer, for they read more and handle their end of the business better. If we would increase the wealth in Canada and the States we must increase the intelligence of the farmer. Heaven knows, he is as unresponsive sometimes as a dolt. You might fire off a shotgun under his nose and he would not know it. (Laughter) C. P. Gooderich, a neighbor of mine, and who has been a thinking, reading and working dairy farmer for twenty years, has a herd of

twenty-one cows, eight of which are two and three year old heifers. He has left the farm now to live in Fort Atkinson, and his son manages the farm. In 1882 his herd averaged about 175 pounds of butter per cow. He commenced to breed out and breed up towards better production, and I am giving you now a little practical picture drawn from the farm. In 1891—nine years after—they averaged 320 pounds per cow: in 1892, 327 pounds; in 1893 339 pounds; in 1894, 353 pounds. Will some of the men who do not believe in this way of managing stock please step forward and show me their record? Can any of them develop cows like this in their way? Yet you may step into any dairy community in Canada or the United States and you will see men who have been handling cows for years, and they will declare up and down that the method Mr. Gooderich pursued is all vanity and vexation of spirit. But, my friends, these kickers and objectors never developed a cow. They lack progressive dairy ideas, and their counsel brings poverty.

The care of milk exacted at the condensed milk factories and other establishments furnishes another idea. I find that the men who are dodging around from one creamery and cheese factory and another with their milk as a rule are unwilling to do right even for their own benefit. Now, I want to call you attention to what men are obliged to do at the milk factories, especially at the Malted Milk Factory in Racine, Wisconsin. The milk strainer must be 100 mesh fine wire; the milk must be cooled to 58° in forty-five minutes: the cans are put into a vat containing three times as much water as there is milk in the cans to be cooled; the cans are washed at the factory and rinsed with cold water before using. Every farmer must rinse his cans with cold water before he puts in the milk. The night and morning milk must be kept separate. If any member of the family is ill the inspector must be notified, and the inspectors have a right to inspect the cows, stables, feed, etc. You will hear lots of people say "That is all blamed nonsense." I will tell you what it is for: They cannot produce fine malted condensed milk without it. It is the only way to prevent the milk being corrupted by all the myriad forms of germ life. As a consequence, these rigid rules are established. Now, this will give you a dairy idea of what it is necessary to do to establish perfect flavor and keeping quality in the product, be it butter or cheese. When you see a man opposing such care and cleanliness, set it down to his ignorance of true dairy ideas.

### Some of the Necessities of Modern Dairying.

1. More dairy intelligence on the part of the farmer. To this end he must read more on these dairy subjects, and if he does not know how to read he must raise a boy or girl that can; but into that man's mind must be got, somehow or other, a larger perception of dairy truths. The weakest man on earth is a man who has a row of hard callosses across his hand and a soft head. (Laughter). How is a man to know more? He must put himself in the channel of dairy ideas; he must read the best dairy literature; he must take hold of books; there must be an attempt at scholarship along this line. The humblest farmer can be a student of dairy truth if he will only set about it.

2. Fine butter and cheese are refined foods, sought for by people of refined taste, who pay the best price. There is no money in a poor food product. Many people make butter for the poor, the poor they have with them always, and so they make poor butter always, and there is no money in that kind of product.

3. There is no other product where the farmer can get such reward for skill and intelligence as in the milk product. Understand that if there is a great truth it is here, and every farmer ought to know it. As between the wise man's barley, the wise man's corn, the wise man's oats and wheat and that of the ignorant man the market makes but little distinction. It is $1 a bushel or less for one man's wheat the same as another's, and no one asks where it comes from, and you cannot discover any indication of the character of the man behind it. With most farm products we are all on a dead level in the market, but not so with the product of the cow. Taste, intelligence and skill tell mightily here. You can buy tons and tons of butter at from three to six cents per pound in the

United States to-day, but the price is twenty cents for the best. What makes the difference? The market never asks what it costs the farmer to produce that butter, but if the farmer exhibits skill the market comes forward and says, "We will pay the highest price, for we want that which is best." When he does this that moment he has stepped out on another plane; he has widened his understanding, I hope, and he has widened his price.

There is another feature about dairying to which I wish to call your attention for encouragement. It is one of the cost of transportation. Never sell a spoonful of grain except to buy something else with worth more in money as a dairy food. Why? Because the price is tremendous. Why? Because you need it. Bulky products cost enormously in rates of transportatian. A dollar's worth of wheat transported 1,000 miles to the seaboard will cost twenty cents; a dollar's worth of potatoes thirty to forty cents; a dollar's worth of butter, five cents; a dollar's worth of cheese six cents; a dollar's worth of eggs eight cents. There are just 100 cents concerned in each dollar and no more. Just look at the enormous profit in the case of transportation between the dollar's worth of butter and the dollar's worth of wheat.

I have just thrown out these ideas, and I am not going to say much about them, but I want you to remember them because they bear with so much weight on the question of *final* profit to the farmer. Here again will it pay the farmer to become a student of dairy ideas.

Remember the Swiss adage "The cow is a cupboard; you cannot get anything out of her that you have not put into her." There are two things you must put into a cow: First, the individual born capacity of the cow, *i.e.*, the breeding sense. You must shape and fashion that yourself. Second, the food she consumes. There is where your feeding sense comes in.

Now, here you see, are two sciences connected with this cow—and I do not argue which is the more important—to study along this line: (1) The breeding of the right cow; (2) The feeding of the right food. But at the bottom, governing the outcome, lies the character of the cow. The cow is what establishes the result, which is never more than the born capacity of the cow. I have heard men declare they could feed for butter. I have, further, heard of a cow that gave butter alone. (Laughter.) The cow establishes the quantity of the product. Therefore, you know, it should be a constant study to gauge the capacity of the cow. Mr. Gooderich, as you have seen, in twelve years found a very wide difference in the cost of keeping an individual cow, simply by increasing the productiveness of his cow.

## Cleanliness in Milking

In an address to a dairy convention in Germany a leading dairy scientist of that country stated that the main results of scientific investigation were ignored almost entirely by the man who does the milking. A bad statement, is it not? In Bavaria the patrons of creameries are not allowed to strain their milk. In that way they can see who are the dirty milkers. This is a new idea, and I am not sure but it is a good one. I never was in such a "fertilizing" state of mind as I have been in at some of our creameries, where the milk was already strained. The amount of manure that is carted away from the farm is discouraging. (Laughter.) An old soldier, who was very destitute once wrote to me when I was in the Executive Chair in Wisconsin. He had been my comrade in my soldiering days, and he wrote one sentence which made me give him without any let or hindrance, what I would not have done under ordinary circumstances. He said: "All my life long I have lived from hand to mouth, and as time passes the distance increases." (Laughter.) That kind of policy is pursued by thousands of farmers with the cow—"hand to mouth"—and if a little discouragement comes, if the prices drop down, the distance between the hand and the pocket gets greater and greater.

Here is a picture of Jefferson County, Wisconsin: It contains sixteen townships, each six miles square. There are eighty four creameries in it and four cheese factories.

It is the boast of Holland that she has a cow for every inhabitant, and Jefferson County only lacks 300 of that proportion. The population is 36,300, and there are 36,000 cows. The dairy product annually for that county is one and a half million dollars, and the total agricultural product annually is $4,300,000. All that has been made possible by the dairy cow. Everything works together for good to them that love the cow. In 1870, when we commenced to inculcate dairy ideas, to get the farmers to take in and practice better dairy ideas, they were stubbornly opposed to any change. All that progress is due to the adoption of intelligent ideas. It is not hard work that has done it so much as intelligence. They are not working as hard to-day as when they were ignorant of dairy ideas, but their reward is much greater. From a better dairy intelligence has come all those happy homes and splendid barns and herds of cows. Those fine herds that dot the landscape are to your humble servant a most gratifying exhibition after thirty years of hard work in striving to promote the spread of true dairy ideas. In 1870 the wheat production of that county had dropped to eight bushels per acre. The soil had been nearly ruined, and sixty per cent. of the assessed valuation of farm lands of that county was under mortgage. I have already given you the picture of what the county is to-day, and now let me say that not seven per cent. of the assessed valuation is under mortgage. (Great applause.) Now, I want to bring another picture before you. In New York State, where they have forsaken the cow for the hop plant, the mortgages are about sixty per cent. of the assessed valuation. In that state the mortgage has been steadily climbing up, while with us it has been steadily going down. What is the matter? Lack of dairy sense—that is all. The New York farmer has been shutting his mind up and away from modern dairy intelligence. The Wisconsin farmer has been pulling himself together, and the price of farm lands in Jefferson County last year per acre was sixty-one dollars. I believe there is no county in the United States that has had the dairy education which Jefferson County has had. A large percentage of the people there are Germans, and some of them cannot read English; but these people have been splendidly answering every effort that has been made in their behalf, and they are a very thrifty people. Hence the contrast I have shown.

## The Value of Cleanliness.

The French Normandy peasant makes the highest priced butter to be found in the London market. He does not have a superior breed of cattle, he never attended a dairy school or convention, but he does beat all Europe in his cleanliness. There is the secret. How this poor peasant does shame many American dairymen, who, with all their conceit, have yet to learn how to be cleanly with the cow!

The low price of butter—an object lesson Prof. Dean gave you a little while ago when he said that the great problem before you is to reduce the cost of producing a pound of butter—is the great question of the day with dairy farmers. I will have more to say on that subject, and I hope Prof. Dean will also, because you have no hope in looking for additional reward at the market end. The prospect is that we shall have a period of low prices, and may be lower than at present, and the question is how to produce the milk more cheaply, because every penny saved in cost adds just so much more to profit. Here is a pointer. The Jersey cow Benjamina, owned by General Burchard, assistant editor of *Hoard's Dairyman*, gave 190 pounds eight ounces of milk from November 27th to December 3rd, one week. From this eighteen pounds one ounce of butter were made. During the test she ate the following ration, worth in the Fort Atkinson market, where I live, the prices given:

| | |
|---|---|
| 175 lbs. corn ensilage @ $2.50 per ton | $0 22 |
| 42 lbs. mixed hay @ $10 per ton | 0 21 |
| 21 lbs. oat straw @ $6 per ton | 0 06 |
| 56 lbs. wheat bran @ $11 per ton | 0 31 |
| 56 lbs. corn and cob meal @ $9 per ton | 0 25 |
| 21 lbs. ground oats @ $15 per ton | 0 16 |
| Total | $1 21 |

Crediting the cow with the butter at twenty-four and one-quarter cents—the Elgin price at that time—and the skim milk at twenty cents a hundred, the total value of her product was $4.72. Deduct cost of keep and you have $3.51. This makes the cost of the butter 6.72 cents a pound. Not only do you get more for your butter if a good cow produces it, and a good man handles it, but she makes it for less cost. It is the good cow that makes butter at a low cost.

### What is a Cow Worth?

That is, what can a man afford to pay for a cow to do a good dairy business with? E. B. Douglas, of Shoreham, Vt., puts the question as follows: A cow that makes 325 pounds of butter a year is worth $75; a cow that makes 300 pounds is worth $65; one that makes 250 pounds is worth $55; one that makes 200 pounds $35, and one that makes 150 pounds—the average of the cows in Canada—$10 (Applause). I think he has put the 320 and 325 pound cow too low, and the 200 pound cow too high Why should anybody pay $10 for the 150 pound cow when she will not make butter enough to pay for the bare value of the food she eats? Now, my friends, I will show you that is true. From all the statistics taken in Canada and New York the cows average about 3,000 pounds of milk per cow, or an average equivalent of 125 pounds of butter. Let me give you some facts. At an expense of $400 I employed a man to take the cow census of the town of Ellisburg, in the County of Jefferson, New York. I put a man in the field and had him figure out every cow (numbering 5,118 in all, I think), and he followed it all summer long, looking into the matter most closely, as to what they cost, what they ate and what they produced. He wrote sixteen letters and then a seventeenth, giving a summary, to the *Dairyman*, and the result was that the cows of that township left the farmers $25,000 in debt Now, some of you farmers are feeling a pain in the pocket all the time, for are you not looking at the market end and not at the production end? The lack of profit in dairying in Canada and the United States is because the farmers will not look at the cow end of this question. If he is the patron of a cheese factory or creamery his eye is always here and he is not concerned as to what it is going to cost to make that cheese or butter. But when you try to draw his attention to what it is costing to keep a cow and what she is doing he is not thinking. The great majority are not thinking. A patron with forty-four cows began to investigate, the result was that he sold twenty-eight of the forty-four. Do you know that man proved, by actual and practical figures based on experiment, that he made more clean profit out of the sixteen cows than he had done out of the forty-four? The poor cows were eating the profits out of the sixteen good cows, and he was dancing attendance on those poor cows the year around for the sake of keeping a big dairy.

The great problem is in the question: What is the amount of money left in your pocket after all expenses are paid? Now, I have said the cow that made 150 lbs. of butter is worth $10. I will guarantee to go out to any dairying section, unless special attention has been given to this question, and, with the Babcock test, will prove to you that a large proportion of those cows are running the farmers every year into debt. Who is to blame? Partly the cow; partly the farmer. Let me give you a illustration. We have among our patrons an Irishman,—who is one of those men that when they are hit on the head half a dozen times will wake up and try to know something about it. (Laughter). One day I went to him at the creamery and said: "Do you know you are a very strange man?" "Yes, I suppose so," he said; "What now?" I said. "You lost $2.50 on those cows yesterday by leaving them outside in the cold rain" "Who was telling you?" he asked. "No matter who; I found it out." "Go along" he says, "tell me, who?" "Well," I said, "Mr. Babcock told me" "The divil take Babcock, who is he?" I said, "Tom, look here, yesterday morning your milk showed so much butter fat the day before there was a very cold rain storm and your cows were outside all day, and I find your milk and butter-fat have shrunk, and I know you could have given those cows shelter for twenty five cents worth of labor." "How comes that anyway?" he said

"Well," I replied, "butter-fat is carbon." "What the divil is carbon?" he asked. "It is a compound that produces heat. If you eat it, it produces heat; if you burn it, it produces heat. Now the cow had to eat more carbon to warm up her body and had less to make butter-fat with." "Do cows do that?" he said. Mind you he was never caught that way again. Now, I have been riding along to-day and I have seen in this cold, cold weather, lots of cows wandering outside or standing up beside a barn, showing what ordinary good cow sense she would use herself if she could get inside. A man cannot afford to warm up a cow and a barnyard with twenty-five cent butter. He can more cheaply buy lumber and build a barn and keep the cow where she will be comfortable, turning her carbon into butter-fat.

In my estimate in the foregoing statement of values in a cow is that the 300 and 325 lb. cow are put too low, and the 150 lb. cow is put too high. Why, should anybody breed 150 lb. cow when she will not pay for the food she eats? It requires 150 lbs. of butter at twenty-five cents to pay for the bare feed she eats, to say nothing of the labor that is devoted to her. While attending a meeting last year in Dalton, Mass., a discussion arose as to the difference in the cost of producing milk among different farmers altogether for the Boston market. On the best of authority it was stated that the difference would range as high as fifty per cent.—that one man would produce his milk for fifty per cent. less than another man. On hearing that a wealthy paper maker—who makes the paper for the United States greenback note and who is a splendid manufacturer and also a splendid farmer—said: "No wonder you farmers need conventions, institutes, dairy schools and dairy papers to boost you into better methods. A difference even of ten per cent. in the manufacture of paper would drive every manufacturer into bankruptcy that made for the higher rate."

You see how these paper makers come together so closely in the cost of their product. They read and study over what other paper makers are doing. Is there anything to hinder farmers doing the same by each other.

We once asked a patron of the Hoard creameries why it was a neighbor kept such a poor lot of cows. The answer was significant. "I'll tell you," he said, "he has an awful cheap idea of the value of a bull. He thinks any grade will breed as well as a registered animal, and besides, he is not a good judge of a bull. I never could help him any, for he knew more than I did about it." I have always found that when a man has a low idea of a bull he has a poor herd of cows. (Applause).

Mr. HOARD, in reply to a question, said: Our substitute for turnips and other roots, is ensilage. We have 800 patrons, and I suppose 300 or more have silos. More will be built this year than have been built in two years before. A succulent food is necessary for the cow to produce milk most abundantly. Turnips, I think, cost too much when compared with ensilage. When I was a soldier I remember foraging on a field of turnips, and really did not have any strength left to march for day or two. Turnips are worth something for fattening cattle and sheep being fed on a heating food, but they are worth very little, in my estimation, for producing milk, and then they are apt to give the milk a bad flavor. If they are fed before milking they are almost sure to give a flavor in the milk. We have the same gradation of ignorance and intelligence that you have. The character of our cows ranges all the way from General Burchard's, which is a thoroughbred Jersey herd, which has this past year averaged about $57 per cow, down to those of men who have barely squeezed through, and, if anything, have lost money with their cows. I would not undertake to tell you what the average of the 800 patrons has been this year. The average price of butter has been low—it must have been somewhere in the neighborhood of eighteen cents per pound for the year. Our patrons keep the creameries running the whole year. Their cows largely come fresh in September, October, November and along. Secure the service of the sire in December or January and you can rear a decent calf every time in that way. If you start the heifer in milk-giving in the fall and then see that she is milked right up to the second period of calving, that establishes the habit of a long milking period for life. Your pasture season is too short in Canada By winter dairying we utilize the five months of constant expen-

sive feeding, and the yearly profit is much greater. Our cows are nearly all Jersey and Guernsey grades. The average butter-fat in the milk of all our creameries last year was 4.60 per cent What is the average here?

Prof. DEAN: About three and one-half per cent., I think, it will run here.

A MEMBER: What do you feed where you have no silos?

Mr. HOARD: We are large growers of corn. We had a tremendous crop last season. Ear corn is selling at $5 a ton; timothy is selling at $8. By feeding more bran, which is a grand thing, and a little oil meal and what is known as gluten, at $8 a ton, a man can very well afford to sell his timothy and use corn stalks or good straw for roughage, and other foods that will stand him in very much better profit as a milk feed than timothy. I think timothy is about as poor a hay as I get hold of for milk.

A MEMBER: Do you grow much clover?

Mr. HOARD: Yes; we grow large quantities of clover if the drouth does not prevent a catch of the first seeding, which has occurred for two or three seasons lately.

Mr. WRIGHT: When the patrons take back skim milk what would be the use of washing the cans at the factory?

Mr. HOARD: There really would be no use if thorough cleaning is had on the farm. But unless the farmer's wife gives special attention to cleaning these utensils the skim milk or whey should never be taken back in the same cans. At some factories they put the cans through a cleansing process; they rinse, scald and steam them. We have had considerable bother in apportioning this skim milk among the patrons. We have finally got it down to a system so that it apportions itself. We have a machine like one of those where a man puts a penny in the slot to weigh himself. If a patron brings 100 pounds of milk and is entitled to take eighty pounds of skim milk back, he drives around to the rear of the creamery. He rolls a weight into the slot which releases a scale, and when eighty pounds of skim milk are run off the flow is automatically turned off

A MEMBER: Do your patrons feed mangels?

Mr. HOARD: Yes, some of them do; but not nearly so much as they did fifteen years ago. The silo has displaced nearly all the root feeding in our section.

A MEMBER: At what age do you have the cows come in?

Mr. HOARD: At two years.

A MEMBER: Is that not too young?

Mr. HOARD: No, I think not.

A MEMBER What about the offspring?

Mr. HOARD: Well, you have already heard about the offspring increasing from 175 to 350 pounds of butter per cow.

A MEMBER: What sized milk can do you use?

Mr. HOARD: We are commencing to use small cans now. You must not take our circumstances entirely for your guidance. We have 5,000 private families that we furnish butter to. As a consequence we have been putting in a large amount of capital, and have been making what we believe to be the finest creamery in the world. So we have been trying to get the patrons into habits of cleanliness, and have bought the cans they are to use, paying a portion of the expense ourselves.

The PRESIDENT: About what will those cans hold?

Mr HOARD: I think they will hold twelve gallons.

The PRESIDENT: That is ninety-six pounds?

Mr. HOARD: Yes.

Mr. CROIL: Do you send the skim milk back in the same cans?

A MEMBER: Have you anything to say on cutting the horns off the cow?

Mr. HOARD: A large proportion of our cows are dehorned—I should say at least 70 per cent. I do not dehorn myself, because I deal only with thoroughbred cattle, and I cannot bring myself to believe it is a good thing for the breeding qualities of the sire, but I may be only "notional" about that. Some think I am.

A MEMBER: How do you keep your cows clean in the stable?

Mr. HOARD: I use what is known as the "model stall." If you will come into my stable and find any manure, or stain even, on the flanks of my cows, I would almost say I would give you the cow: and it is done mechanically. The cow is compelled to keep clean. She is tied with a halter; is given three and one-half feet of space in width, and stands in front of a feeding rack sloping towards her so that it forces her to step back when she stands up. Just forward of her hind toes a bar three inches high is nailed across the stall, and all the droppings go to the rear of that bar. When she lies down she steps forward and lies down on a dry, clean bed. There are a few farmers in Canada that I persuaded to try it, and it acts well with them. Then we have a good many of the Bidwell stalls. There is a good deal of land plaster used among our dairymen in the stables. Land plaster will take up all the foul and ammonia gasses and sweetens the stable.

A MEMBER: Do you think a stone stable is good?

Mr. HOARD: I would just as soon have it as any other, if there is plenty of light, and a board lining is put in for those cows that stand next to the wall.

A MEMBER: Is it preferable to have it under the barn?

Mr. HOARD: Yes, if there it plenty of light, but we need four times the number of windows if it is under a barn than if it is not. Sunshine is the best disinfectant we can have.

Mr. WRIGHT: Do the patrons deliver their milk to the creamery?

Mr. HOARD: Each patron delivers his own milk, or pays for its delivery.

A MEMBER: How about the stone stable? Is it not unhealthy by reason of steam and dampness that arises?

Mr. HOARD: Not if you have the stables properly ventilated. The great mistake is in making the ceilings too low. Each cow should have 800 to 1,000 cubic feet of air. You can easily provide for this by higher stable room.

Mr. WRIGHT: Do you not think there is less injury to the milk after it leaves the stable than before?

Mr. HOARD: Right from the time the milk leaves the cow until it gets to the mouth of the consumer there is a constant attack upon its purity. It is just as cheap to build a cow stable right as wrong. The idea that stanchions are a good thing is wrong. What are they put up for? There never was a man who put in one for the cow's sake. The stanchion is handy and safe: that is all that can be said for it. You can never keep the cows both clean and comfortable with stanchions.

A MEMBER: How much of a drop would you have behind the cow?

Mr. HOARD: Only two inches. I have as little as possible, for fear of the cow hurting herself. When cows are heavy with calf they are often injured by slipping into the deep drops. The stanchion and the deep drop were never made for the comfort of the cow, but always for the convenience of the owner. In constructing a stable, the first thought, if we are wise dairymen, will be the comfort, contentment and health of the cow. Under such conditions only will she do her best for us. But few farmers ever went to the trouble of putting a cow under different forms of stabling to see which was the best. Hence their judgment is without comparative experience. Study the *comfort* of the cow if you expect the largest profit from her.

## THE CITIZEN'S BANQUET.

The banquet which the citizens of St. Marys tendered to the Association at the Opera House at night did credit to themselves as it did honor to their guests, and the latter will not soon forget the exceedingly pleasurable occasion. The tables were beautifuly arranged, and the bill of fare provided all that the most fastidious could desire. The galleries were placed at the disposal of the ladies, and quite a large representation of the fair sex lent a charm to the occasion by their presence. It is seldom that so many excellent after-dinner speeches are to be heard on such an occasion as those which marked this banquet. Taken all in all, it was perhaps the most successful affair of the kind in all respects which the Association has experienced, which is saying a good deal.

## WINTER DAIRYING.

By Mr. A. A. Wright, Renfrew.

I am not on the programme, as you will see, but we are told in the Scriptures that we ought always to be ready to give a reason for the faith that is in us, and I believe I ought to be always ready and willing, so far as I can, to give a word of encouragement and to assist in every way possible our brother dairymen wherever they may be Times have changed, and we must, if we wish to make our business a success, change with them. I need not tell you that there is no money in raising horses. There used to be; but the electric cars and other causes have made the raising of horses for profit entirely out of the question. So far as beef is concerned, in our section of the country, it is selling at so low a price that farmers cannot afford to raise cattle for beef at that figure. So far as dairying is concerned, if we carry it on in the old-fashioned way there is no money in that either. The day of dairy butter is past, but there is a market in England if we make it in creameries. You all know that the cheese business has become an unqualified success, so far as the making of a first-class article is concerned, but at the same time, while we ought to assist that industry, we should give attention to dairying the whole year round. There is no use trying to keep cows in milk only six months of the year. A cow is exactly like a steam engine. Take an engine and run it for six months and then allow it to be idle the balance of the year, and it will not last half as long as an engine that is running continuously night and day. Take a cow and run her only six months of the year, and she is a burden to you the remaining half of the year. I know what I am talking about. If you go into my herd of cows I will show you as fine cows as you ever laid eyes on, and they have never been dry a day since they commenced giving milk. I know some of you will say their offspring will be weak and puny. I will show you as fine offspring as you can desire to see. They are not weak and puny, but on the contrary, I took the first prizes for Jerseys at our show, not with weaklings, but with first-class young stock. Now, imagine a farmer when the fall comes, saying to his wife: "The hired man has worked hard all summer and we must give him a rest all winter so that he will be able to work next summer." (Laughter.) But because you have been doing that with the cows you think in their case it must be right. It is rest that is killing us all; it is work that is going to lift us out of the rut, and the cows must work as well as the rest of us. Are you going to do the service and be the slaves while they stand by and are the masters? I think it is high time that the thing was changed around, and let the cow do some of the work and let man have some of the profits for his labor. The only way to do is this, we are going to make butter just as well as cheese in this country. It is true I am a butter man, but I have no ill will towards the cheese men. The cheese industry has been a grand thing. There is nothing that has helped to raise more mortgages off the farms than the cheese factories, and we want them to continue, but you know we cannot make cheese in winter. Now, my idea is when there is a cheese factory, let it go right on making cheese in the summer. Then, suppose there are thirty or forty cheese factories in one locality, I would put up one central butter factory, I would take

the milk to these cheese factories, take the cream off there, and then send it to the central factory and have it all made into butter by one man. You know it is a comparatively easy thing to get one man who knows all about making butter, but it would be a different thing to get thirty or forty expert butter-makers in a section. If we are going to get the English market we must make a first-class article of butter. I would like to say here that we can make a first-class article of butter in Canada. There is no country in the world better adapted for making good butter than Canada. We have proved it already. It is a false idea which is abroad that any man can make butter and cheese, but you can accomplish it by following the method I have alluded to. Now, some people think there is going to be no money in dairying; I tell you there is. There is more money in that than in anything else the farmer can engage in. You know we cannot compete in grain growing with the western country. Some people think because we have a cold climate we cannot succeed in dairying. I tell you we can. We have the bone and muscle and intelligence to succeed. In the matter of a climate for making butter, we are ahead of any country on the American continent. Just look at the reports in some of these foreign dairy papers, where they tell you that the cows were beset night and day with flies, and the cream came to the factory in such poor condition that it was impossible to turn out a first-class article of butter. Our climate is away ahead of theirs. You have not anything like their troubles. In summer, you have your ice, and we have advantages in other ways. Take these men who live in a southern climate and they become sluggish and indifferent, but in this northern zone we have to be active and intelligent, and so we have advantages which far more than compensate for our drawbacks. We can grow corn for ensilage, and if we hang on to the corn and put it in the silo and make a first-class article of butter we can succeed. The difficulty until now has been to get the butter to the Old Country in perfect condition. Now, I am proud to say, we have got for Minister of Agriculture for the Dominion a man who is a practical farmer and who has a large amount of common sense. (Applause.) Just as the children of Israel, from the rising of the sun to the going down of the same, upheld the hands of Moses, so let us hold up the hands of Hon. Mr. Fisher who is a god-send to us and a deliverer. (Applause.)

A MEMBER: How do you manage to keep the cows milking all the time?

Mr. WRIGHT: The difficulty I have with my cows is to keep them from over-doing it. If you milk a cow with her first calf right along all the time she will be a persistent milker afterwards. If you dry her at six months with her first calf she will be a six months' milker all the time. One of the finest cows I have gives me seventy-five lbs of milk a day.

A MEMBER: How many times a day do you milk her?

Mr. WRIGHT: Twice and sometimes three times a day.

A MEMBER: What breed is she?

Mr. WRIGHT: She has no particular breed.

A MEMBER: What do you feed her?

Mr. WRIGHT: Just the same as the other cows. I have to-day a $25 cow which is away ahead of any Jersey I have in the herd. If you are going to make money you must keep track of the cows. Every ounce of butter given by my cows is ascertained night and morning, and entered in a little book, and every ounce is given for the day, week, month and year; and you cannot weed out your cows in any other way. You think that is an awful lot of trouble. No, it is not. It does not take half as long as you think.

A MEMBER: When you milk your cow right up to the time she has calved will she not slack away in her yield?

Mr. WRIGHT: Yes.

A MEMBER: Do you use her milk right after she has calved?

Mr. WRIGHT: I feed that milk right to the calf or the cow for a month. If you do not want to feed your skimmed milk to your pigs or your calf what will you do with it?

Why give it to the cow. Then half your work of making her give milk is done. All you have to do is to give an excess of food which will make butter; the milk is already largely made for you.

Mr. LEGGE: The young stock must be deficient. There are not many producing good stock in that way.

Mr. WRIGHT: You can come down and see my stock: they are not weaklings. If you will feed properly they will not be weaklings. If you feed on the straw stack they will. My young stock are just as strong as the stock from cows which milk for six months.

A MEMBER: I have tried milking continiously and my experience was not good. I like my cows to go dry for six months at least. My experience has been that you get a bigger return if you let the cow dry up about a month before she comes in.

Mr. WRIGHT: I keep a cow to make money. This $25 cow I spoke of I milked but seven months in the year when I first got her. Next year she gave me milk for eight months. The next year again she milked longer, and so on until now she is a persistent milker, and every year I get more money than before. The second year she gave me more than the first, the third more than the second, and now she gives me more than four years ago. The eleventh month I get the milk for the calf, and she does not eat any more than she did four years ago.

A MEMBER: She is an exceptional cow. Do you not find in the majority of cases they put on beef.

Mr. HOARD: That is owing to the temperament of the cow.

Mr. WRIGHT: Get rid of a cow that takes on beef. The class of cows you buy have a tendency to do that. The class I raise have a tendency the other way. There are other men selling milk besides myself, and I have to give the customers good milk or they will not buy from me.

The PRESIDENT: I know Mr. Wright's herd, and his milk, and there are no better. At the same time I would not advise you to continue a cow in milk more than ten months. Do not milk them longer, for their benefit and your own.

Mr. WRIGHT: I was brought up with the same ideas, only I started with the six months idea and he has started with the ten. (Laughter). Ninety-nine per cent. of the ideas I have got about dairying I owe to *Hoard's Dairyman*, and I would not have been at this meeting had it not been that I wanted to meet Ex-Governor Hoard and shake him by the hand. He is a dairyman, and I owe him a debt, but I do not know how I am going to pay him back. I do not want to owe any man anything, but he has a mortgage on my regard. (Laughter).

A MEMBER: Do you think there is more money in feeding milk to hogs than to calves?

Mr. WRIGHT: That is a horse of another color. I do not raise hogs. I am not prepared to say. There is no money in milking cows two or three years old; it is milking the five year and six year and fourteen year old cow that pays. Stop killing your cows just because they stop giving as much milk as some of the other cows whose milk is not so rich. If you are sending milk to a creamery a stripper will give almost as much money as a newly calved cow.

A MEMBER: What do you feed?

Mr. WRIGHT: I feed bran largely at this season of the year. We get it for $8 a ton. For a milk cow, bran is a grand food, and I feed them just as much as one can get them to eat properly, with straw and corn stalks.

A MEMBER: And you do not feed grain with that?

Mr. WRIGHT: Yes; oats and peas. We can buy oats at nineteen cents and peas at forty cents per bushel.

A MEMBER: What quantity of ensilage do you feed?

Mr. WRIGHT: I do not feed ensilage yet. The silo is in view all the same.

## COLD STORAGE.

By Prof. Robertson, Dominion Dairy Commissioner, Ottawa.

Before I speak on the methods of cold storage that can be used, I want to say a very few words on how cold storage will be valuable to the people who live on farms and strive to make a living by their labor there. I think any one will see at once that the surest way to increase the prosperity of any country is to increase the farm products in it. The making of more farm products increases the wealth of the people, and lessens nobody's possessions. If the volume of farm products—butter, cheese, poultry, fruit, meats, cereals, etc.—can be increased and the prices raised, everybody will be rather better off; and in so far as cold storage will help in these two directions just so far will it be of real value to this country.

How can cold storage raise the price of our products? The price of all food articles is governed very largely by their condition and not by their composition. As an illustration of this the composition of a basket of peaches is almost the same when they have the bloom on their cheeks as when they are beginning to rot, but in the one case they have attractiveness of appearance and will bring the best price, and in the other case they possess an unsightliness of condition that makes them worth nothing. In so far as cold storage will preserve the products of the farm until they reach the ultimate market just so far will it raise the price which the producer may obtain. Not only does that affect the men who make a living on the farm, it affects all four classes in our country whose labor is concerned with the increase of wealth through agriculture. We hear a good deal of misleading and entirely demagogic nonsense about doing away with middlemen. In our country there are four interests always wrapped up in the matter of the farmers' condition.

### The Primary Object of Cold Storage.

In the getting of profits from perishable food products, different parts of business are concerned. There is the matter of production, which is attended to by certain classes of men; there is the question of collection, which is attended to by another group of men; there is the business of transportation which is in the hands of another set of men, and the distribution of these food products, which is looked after by another division of men. These four interests or occupations are so inter dependent, that one cannot be removed or injured without hurting all the others. In considering any system of cold storage, account must be taken of them all, for where one or more of these interests are neglected the others suffer. The middlemen are just as essential to profit-making in Canada as the producers or consumers.

The question is how can the nation's or country's business in the most inclusive sense be conducted so that each class may have a better chance to a larger profit without loss to the others.

Among the products capable of yielding larger profits from an adequate system of cold storage are butter, eggs, cheese and fruit. Poultry might be added to the eggs. The farmers themselves in handling these perishable commodities have always looked for cool storage to retard the decay of these things. Why put a tub of butter or a basket of eggs in a cellar except to retard any change?

If there be any way whereby the change could be entirely stopped, that would be still better. Cold storage may arrest all change and keep the goods in the same condition they were in when they were produced. Some farmers put butter and eggs and apples in a cellar; and others have been putting up icehouses to preserve butter for a longer period. That is simply for home use and the home market, and that, I think, is the only part of cold storage the farmer should seek to control.

### The Commercial Phase of Cold Storage.

The commercial part of cold storage comes next. Already there are commercial agencies in Canada with warehouses for storing goods at low temperatures. In Montreal there are three large cold storage warehouses either in existence or in process of construction. These are commercial conveniences for the handling of goods from anybody at certain fixed rates; and their business last year was said to be profitable to the men who invested money in it. If the business is to be extended into other localities and spread all over the country, it seems to me that the people in those localities who are interested in commerce, as well as in production, should get information as to the benefits that will result from this accommodation if provided.

The following table shows the values of certain food products imported by Great Britain in 1895, and the portions of these supplied by Canada:

| Articles. | Value. | From Canada. |
|---|---|---|
| Wheat, barley, oats, flour, etc | $241,986,692 | $7,335,599 |
| Animals, living (for food) | 43,635,759 | 8,052,294 |
| Dressed meats | 114,109,534 | 4,608,904 |
| Cheese | 22,752,299 | 14,220,505 |
| Butter | 69,326,786 | 536,797 |
| Eggs | 19,483,437 | 524,577 |
| Fish | 14,495,226 | 2,974,850 |
| Fruit, raw | 23,680,290 | 1,711,769 |
| Lard | 14,317,446 | 103,833 |
| Milk, condensed or preserved | 5,273,320 | ..... |
| Potatoes | 5,693,620 | 556 |
| Poultry and game | 2,945,112 | 6,845 |
| | $577,699,521 | $40,076,529 |

### The British Market for Food Products.

The English are good customers for food products; of all people who purchase food they are the best. They are the customers of the world for the nations of the world that produce a surplus of food products. I have looked over the map and the returns of the British Board of Trade, and I find nearly every civilized country is a competitor for a place in the British markets. Denmark, Germany, France, the United States and all the rest of them are engaged in a most strenuous and merciless, though peaceful, competition for the best place in her markets. If you want to pursue that point further, there are Spain, Italy, Austria, Sweden, Norway, Finland and nearly all other countries whose people are civilized that send foods to England. I find very few exceptions; the British take either fruits, cereals, meats or other animal products from them.

The true meaning of cold storage service for the Canadian farmers is that it will provide safe transportation for perishable farm products. In that way they may reach the ultimate consumers in such a condition that they will eat more of them, and pay the highest market price for them. The best class of consumers will become customers for our Canadian products and will pay such an increased price that farmers here will be enabled and encouraged to produce more.

The total value of the twelve articles imported into Great Britain, mentioned in the table, amounts to the enormous sum of $577,699,521, of which Canada sent only $40,076,529, whereas with our population and area of land in cultivation, we should have sent at least one-third of those commodities.

Out of every hundred workers in Canada, forty-five are laboring practically to produce foods. If these forty-five men out of every hundred carried on their work in the

most skilful way, we might from the twenty-eight millions and a half acres of land now in occupation, produce the greater part of the enormous quantities of foods required by Great Britain. If one examines the outputs of certain farms which are carefully managed, without any extra or fanciful expenditure, he will find that if ninety-five out of every hundred farms in Canada did produce each per acre as much as the other five farms do now, we could send the whole of that quantity of food out of Canada in this year of grace 1897. Our national failure to do so is not due to the weather or to the soil, or the markets; it is not due to anything else but the absence of adequate knowledge of how to make the most of these things which surround us, and of unflagging energy to put that exact knowledge into practice in all the little and large affairs of agricultural work.

In passing from this aspect of the question to speaking of how cold storage can be obtained, let me emphasize the remark that now-a-days people pay for articles of food according to the daintiness of quality and condition and not according to their composition.

### The Problem of Providing Cold Storage.

I might detain you one moment more to make a report on the cold storage question as it now has to be faced, and what I think could be done to provide the service that the Canadian people really need.

In all dairy products and other fine food products, the one quality or attribute that makes them of exceptionally high value per pound, is daintiness of flavor. I can find time this morning only to illustrate this principle, which you will catch in a moment—that the quantity of substance in any food commodity is almost no index of its value, but the condition of the substance as to quality and flavor is the one thing that determines its price.

The color and flavor are the qualities that determines its commercial value. In apples, color and flavor are what are looked for; a rotten apple weighs as much and contains as much substance as a good apple. We have taken no pains in Canada until almost within the last few years to preserve for long periods, these two things in perishable food products—daintiness of flavor and color. Cold storage is everywhere resorted to to preserve the daintiness of flavor of butter; and we can never hope to obtain a leading position in the markets of Great Britain, unless we have a cold storage service at the creameries, at the warehouse, on the railroads, and on the steamships.

We need cold storage accommodation, not merely for the preservation of the quality of the product, but we need it to lengthen the marketing period. It has been complained a little in certain quarters that cold storage merely provokes and permits speculation. Now, the speculation that consists in buying a quantity of an article with a view of holding it for future consumption, is a wholesome factor in trade and not a disastrous one. We make cheese in Canada for five and a half months, and cheese that are made then have to be spread over twelve months of consumption. So it is said, if we can lengthen the period of consumption for apples and other fruits and for cheese and butter without deterioration in their quality, which we shall be able to do by means of cold storage, we have every reason to expect we shall be able to get the bulk of our products on the market at the very best time, in regard to prices, available or obtainable. I have said on other occasions, that the average price in England for butter of the best quality is six cents a pound more from October until March, than from April until August. Now butter can be held from April until August, at a cost of not more than half a cent a pound for storage, and, if held at a proper temperature, without losing the least bit in quality. That has been demonstrated by our experiments in shipping. It is, therefore, of very great importance to have cold storage in order (1) to preserve daintiness of flavor, (2) to prolong the season of consumption, and (3) to give us a chance to get at the market at the best time, when the highest price is being paid. That would promote making more butter here, and with it would come the feeding of more swine, and the associated industries that would respond quickly and make our country a great deal more prosperous than it is at present.

THE PRINCIPLES OF CONSTRUCTING BUILDINGS.

*The insulation* of a cold storage building should make it as nearly air-tight as practicable. A cold storage room should not be larger than is actually necessary.

*An insulating material* is any substance which prevents or almost wholly prevents the passage through itself of the form of energy known as heat. Different substances conduct heat more or less rapidly and are spoken of as being good conductors or poor conductors of heat. Whatever is a good conductor of heat would be a very poor insulating material; and a substance is a good insulating material in proportion as it is a poor conductor, or non-conductor of heat.

For the insulation of a cold storage building the requirements are that the interior of the room or rooms, where the products are to be stored, shall be separated from the ground and from the ordinary atmosphere by efficient insulating substances. Among those are wood, paper and *still air*, such as air confined in hollow spaces formed by lumber and paper, or by some other insulating material, such as mineral wool, dry sawdust, or dry wood shavings. If the sawdust or other material becomes saturated with water it loses its insulating qualities and becomes practically a heat conducting material, like a body of water.

*Air in circulation* is practically always conveying heat or cold, and is one of the best distributers or carriers of heat or cold. But it is slow to convey heat except by its own motion, and thus it becomes an insulator which offers the greatest obstruction to the transference of heat through itself, when it has not the freedom to circulate.

The insulating efficiency of hollow spaces in the walls depends upon the closeness of their construction. If the air in them can circulate, to that extent their insulating qualities are lessened. To prevent the circulation of air every precaution should be taken in putting on the building-paper to make the places where it laps thoroughly close; and two layers of building-paper should be put on the outside of the rough boards on the studs.

*Building paper* is an excellent insulating material. It is practically air-proof, and thus prevents circulation of air through itself; but if the places where it laps over, in being put on, are not made perfectly close, that air-proof quality is lost. Particular pains should be taken in putting the building paper on, to see that it is not torn in any place and that there are no holes in it. Whenever a hole appears a patch should be tacked on, making that part close. *Two layers* of building paper should be used between the two boards which make the inside lining of the refrigerator room.

It is necessary that the paper used should be free from all offensive odour. *Tar paper is not suitable.* It should be strong, and it is preferable that it should be waterproof and vermin-proof. Different qualities of paper cost different prices. Paper suitable for use may be purchased, costing from $2 to $4 per 1,000 square feet.

*The hollow spaces* between the rough boards on both sides of the studs should be filled at the bottom to a depth of *six inches with mineral wool.* If put in carefully, mineral wool will hold the air in confinement and prevent it from getting in or getting out.

If the spaces in the wall could be filled from bottom to top with mineral wool the insulation would be all the more thorough; but that would add unnecessarily to the cost of the building. Mineral wool is vermin-proof. If sawdust should be used in its stead, the insulating quality of the sawdust would be satisfactory; but sawdust is apt, after a few years, to become musty, and to give off smells which would taint butter. It also becomes a harbour and nesting place for mice and rats. Mineral wool can be bought for about $15 per ton in large quantities; it may cost more when bought in small quantities. One hundred pounds of it will pack from forty to forty-five lineal feet of wall, six inches deep in a hollow space, six inches wide between the studs. The cheap quality of mineral wool is suitable for this purpose, and wherever practicable it is of advantage to have six inches of it at the bottom of every hollow space to prevent any air from getting in or out.

The layers of paper, and the hollow spaces in the sides of the wall, should in every case be continued around *in the ceiling without interruption.* If the walls be finished up past the ceiling and then the ceiling be brought against them, touching only the inside of them, the air may find admission inwards or outwards through cracks or slight openings between the ceiling and the walls. Where the layers of building paper and the hollow spaces in the wall are continued around without interruption in the ceiling, the insulation is thorough and air cannot get out or in at the corners.

The layers of paper in the walls should also, where practicable, be brought down *under the top thickness* of the flooring lumber. If an opening occurs in the floor, or between the floor and the walls, then the cold air of the refrigerator will flow out through that, as water would flow out of a vessel if a hole existed in the side or bottom of it.

The lumber for insulation should be spruce, basswood, hemlock, or other wood free from objectionable odour. *No pine* or other wood of strong odour should be used. All rooms should be whitewashed inside before being used for storage purposes.

*When the door* of a refrigerator room is opened into a chamber or place where the air is warm, the cold air of the refrigerator flows out quickly, and the warm air of the other place flows in. To prevent injury from that cause to products which may be held in a refrigerator, it is recommended in every case that a receiving-room or ante-room be constructed. The door of it may be closed before the door of the refrigerator is opened. The doors should be of double thickness, and one door should be hinged to both sides of the wall. Attention to these small matters will permit the refrigerator to be kept at a uniformly low temperature for the preservation of its contents. If butter be cooled at a temperature of even 35° Fahr. during 22 hours of the day, and left to warm up to 45° Fahr. during the other two hours, the injury to the butter lessens its keeping qualities and its commercial value. The same is true of other perishable food products.

Cold storage buildings are not primarily to promote speculation. They are conveniences for the holding of perishable food products in an undeteriorated condition. These conveniences may place the owners in a better position to market them to advantage, since they have a longer marketing season available, with a certainty that the goods can be delivered without being spoiled.

I shall not occupy any time with a statement of the manner of constructing cold storage compartments on the steamships. However, by a means of cold storage service beginning at the creameries, passing over the railways, provided in the cold storage warehouses at the shipping ports, and arranged for on board the ocean steamships, it will be practicable to send Canadian goods from the Canadian farms to the British markets in an almost undeteriorated condition.

Once we are able to show to the consumers of Great Britain that we can supply them with first-class quality of butter, poultry, eggs, meats and fruits, we will find the trade in these things with Great Britain to be most profitable branches of commerce and agriculture.

## ADDRESS FROM THE TOWN.

Mayor DUNSEITH took the platform and read the following address:

*To the President and Members of the Ontario Creameries' Association:*

On behalf of the citizens of the town of St. Marys, I extend to you a hearty welcome. Our town is situated in a magnificent country, where all kinds of cereals and fruits are grown and where the cheese and butter industries also flourish.

As yet, however, the creamery business has not attained the growth which its importance would seem to warrant. We, therefore, rejoice that your Asosciation has honored us by meeting here, inasmuch as we believe that an impetus will be given the creamery business, which, while immensely benefiting the farmer, will do much for our town.

We assure you that our manufacturers and business men will be pleased to have you visit their establishments, and will extend to you a hearty welcome. We trust your meeting here will be pleasant and successful, and that you will retain pleasing remembrances of your visit to St. Marys.

In conclusion, I have much pleasure in conferring on you "the freedom of the city."

WM. DUNSEITH, Mayor.

President DERBYSHIRE in reply said that there had been abundant evidence of the hospitality of the people of St. Mary's ever since the opening of the Convention. While he thanked the mayor and the townspeople for this fresh expression of good-will, he at the same time assured them that the members of the Association were delighted with the treatment experienced during their stay.

## A PRACTICAL TALK.

BY HON. SIDNEY FISHER, DOMINION MINISTER OF AGRICULTURE, OTTAWA.

After expressing his pleasure at being present, Mr. Fisher referred to the honor which he felt Mr. Laurier had conferred upon him, as well as upon the dairymen and agriculturists of Canada, by appointing a practical dairyman and farmer like himself to the portfolio of agriculture. Adverting to the difficulties that lay before him, he said that on account of being a farmer his fellow farmers no doubt expected greater things of him than they might of another. At the same time his hands were being upheld by the farmers all over the country, who were coming loyally to his aid.

Turning his attention to dairying, Mr. Fisher characterized that as the highest branch of agriculture. When he first started farming, twenty-four or twenty-five years ago, he had made a study of dairying, and ultimately decided that it was the proper line to follow. Continuing he said: I was able to attend school and pass through college, but ever since I have been a grown man I have devoted my whole time and attention to the pursuit of agriculture, and yet I have by no means reached the limit of the information in connection with that calling to which I may attain. I, therefore, feel that I am one of a class of business,—or a profession if you choose to call it so—in connection with which there is the amplest scope for the use of intelligence, for the application of the highest intellectual as well as manual skill, and under these circumstances I think we who are farmers and dairymen may well be proud of the business we are engaged in, and may justly and fairly ask the young people of this country who are intelligent, to go into our business, because it will afford them abundant opportunity for the fulfilment of their highest ambitions. Dairying, I say, I consider to be the highest branch of agriculture, because it reduces the crude material we bring out of the soil to the smallest possible bulk and is of the highest possible value. Further than this, in the pursuit of dairying we are drawing upon the fertility of the soil to the least possible extent. Now, I venture to make the broad statement that the farming of this country must in future depend upon stock raising; that the old days when we could depend upon grain growing have passed away from us forever; that the aspirations of the farmers will not allow them to submit to reaping and mowing and threshing and turning the grain over to the millers to make the profit upon it. They want something more to-day; and, further, they to-day appreciate the fact that in selling the crop from the farm they are constantly drawing on the bank of fertility. If they are going to keep up the fertility of the soil, if they are going to continue from year to year to make it better and better, and consequently to put themselves in better circumstances, they cannot persist in that series of cropping, but must return fertility to the soil, whence they drew it. This being the case, we are limited to certain lines if we are to make progress on the farm; we are restrained from doing the worst part of farming and forced into the higher branches of the business.

Now dairying to-day is assuming a new position in Canada. I would not assume in this part of Canada, coming as I do from the Province of Quebec, to undertake to teach you anything about your business. I know that this part of Canada is the home of Hon Thomas Ballantyne, a gentleman who, when dairying was a small industry in this country, was in the forefront of this industry, and who, appreciating the difficulties under which Canadian dairying was then laboring, had the foresight and intelligence to see what was necessary to remedy the existing condition of affairs, and had the enterprise to bring about the co-operative system which has accomplished so much, and we in Quebec have taken the model from what you under his leadership have been able to do. I would, therefore, be in a ridiculous position if I were to undertake to teach you something; but I may give you information which will be interesting, if not instructive. Dairying to day in Canada is divided into two branches—butter making and cheese-making. You in Ontario stand at the head of the cheese-makers of the Dominion of Canada. I shall not say of America as well; but I think I may say of the world. (Applause). You have secured that position. How? By constant care, steady watching of everything connected with the business, seeing if in any detail there was a possibility of improvement and carrying out the improvements found necessary. I do not think to day Canadian cheese-making could be much improved. Perhaps, you may say who are acquainted with it, there are still worlds to conquer. Butter making, however, is not quite so far advanced in Canada. Here there certainly are worlds to conquor. The Creameries' Association has done a great deal to give us the means by which those worlds may be conquered. You all remember how cheese-making was advanced by the introduction of the co-operative system. I venture to say the introduction of that system has done more to benefit the farmers than any other change which has occurred in agriculture in this country. It is not simply that to-day our cheese stands at the head of the market of the world; it is not only that you are able to make a great deal more cheese than you did before the system was introduced. Those are great advantages, but they are not by any means the only advantages. The great advantage is that the system has brought the farmers together. They recognize that their interests are one and identical, and they come together to discuss their business. They thus find out where each and all are at fault and try to remedy these faults. The result has been a drawing together of the isolated farmers of the country, so that they are able to form associations, by reason of which they can discuss their business and find out how to improve their methods and benefit themselves and their business This is the greatest advantage of the co-operative system. My own particular neighborhood is a living example of this. I come from the Eastern Townships It is an ideal dairy country. We have a broken country, with hillsides, out of which, every few hundred yards, splendid springs of water flow. These springs of water and hillsides produce a most glorious herbage—luxuriant and sweet, and just the ideal herbage for the dairy cow. We have a country in which we can grow corn for ensilage purposes. We have a climate in which we can grow the coarse grains, but from the hilly nature of the country it is difficult to cultivate the soil largely. Our housewives in the old days, taking advantage of these conditions, made a very fine quality of dairy butter. Their butter was noted in the markets of Canada, and they obtained a cent or two more per pound than was paid for butter made elsewhere in the Dominion. Then you formed your Creameries' Association, and what was the result? In two or three years the eastern dairy butter had to give place to western butter. The information which was disseminated through the country by means of this Association showed the superiority of your methods over the cleanly manipulation of the women of the Eastern Townships, though they were very good at their particular work, and co-operation triumphed. We learned our lesson. We had set to work to follow your example in cheesemaking, and to-day there is a very large proportion of our milk made up into cheese; but at the same time we found, further, that we could not compete with you in cheese. You were ahead of us; we could not catch up. We did a good deal to catch up, but you are a little ahead of us yet. Then we brought the same principles to bear upon the butter making industry, and to day there are about 120 creameries in Quebec which make butter the whole year around. More than that: You know in the Province of Quebec there is

a large section of the population French, and there is a part of the Province which has been cut off more or less from contact with the outside world. A part of the people were backward in a far-off section of that Province—away eighty or ninety miles north of the city of Quebec, away out of the reach of civilization almost, although the country was settled before the conquest of Canada—a section known as the Lake St. John district. Five years ago the people there did not make enough butter and cheese for their own needs They were not prospering, and in consequence were uneasy in their position. Then we saw the need of a factory system and of a system of inspection and instruction. We introduced such a system, and as a result that district last year sent $300,000 worth of butter and cheese to the city of Quebec. That is the result of co-operation; that is the result of instruction; that is the result of factory inspection; and if in my public life I am proud of one thing more than another it is that I was charged with the duty of drawing up the Act under which the system of factory inspection has been carried on in the Province of Quebec for the last five or six years without a single change. To-day the Provinces of Ontario and Quebec are going ahead in the butter industry, and it is well, not only for the butter makers, but for the cheesemakers of the country that this is so. I want to draw your attention to the fact that the Dominion last year sent out about $13,000,000 worth—about 150,000,000 lbs. of cheese. We know that was considerably more than half the cheese imported into England. We sent out also about 10,000,000 lbs. of butter. Now, if the milk which was made into that butter had been made into cheese, it would have made 25,000,000 lbs. more of cheese, and we would have added fifteen or sixteen per cent to the cheese we had to sent to England, and had that additional 25,000,000 lbs. of cheese been put upon the English market it would have seriously affected the whole cheese market of England, and the cheesemakers and patrons and cheese factories would have been just so much the poorer.

The PRESIDENT: That is a good point; mind it.

Mr. FISHER: But the butter we sent did not make a single perceptible ripple upon the butter market of England. It did not increase the price one iota, and, instead of 10,000,000 lbs. or 20,000,000, we can send 50,000,000 lbs., perhaps without affecting the price in England. Not only that, but in consequence of the introduction of the creamery system the reputation of our butter has risen materially. The same thing is occurring in connection with our butter as took place in connection with our cheese a good many years ago. You began by making a little cheese; you put it on the English market fresh; and there was a demand for more and more of it, until last year you sent over 150,000,000 lbs. The same thing is going on in the butter market. Three years ago you sent about 30,000 packages, the season before last 60,000 odd packages, and the season just past you sent 160,000 packages, from the city of Montreal. We have been doubling up in this matter, and at the same time as the export has been increasing the price has increased. Why? Simply because as the people in England find that we can make and send to their market a first-class butter we establish our reputation. Last season Prof. Robertson tried experiments in shipping butter from a few creameries in the Northwest Territories. One of these was at Saskatchewan, 1,700 miles from Montreal. There was butter at that creamery put in cold storage the day after it was made, a little later put into a car in cold storage and taken to Montreal, and then put into cold storage on the steamship and taken over to Bristol, and that butter brought 114 shillings per cwt. in the English market—the highest price, with the exception of the most superior Danish butter, realized in the English market last year. You see what can be done in the butter business by co-operation and the introduction of creameries. I believe—most thoroughly and sincerely believe—that next year we can double our export again. I would like to say we can go on year after year doubling it. Perhaps that would be too sanguine; but I can tell you it simply remains with the farmers of Canada. They can do it if they choose. Prof. Robertson has told you very distinctly and clearly that it is important in this country to please the palates of the people in England. I quite concur in that view, and it is because I concur in that view, because I believe in the importance of this matter to the farmers of Canada, that I am determined to secure an arrangement by which our products can be placed on the English market in the best possible condition

as soon as that can be accomplished. I have set out to establish a chain of cold storage right to the door of the consumer, and I think I am in a position to say that before next season such a chain of cold storage will be actually secured for the people of Canada In the first place, we propose to offer a little encouragement, a little inducement if I may so call it to creamery men to put up cold storages at the factories. I find that a large amount of butter in this country after being made is injured before it ever leaves the factory, from the fact that there is no accomodation to control the temperature in which it is kept. One or two hours in a hot day will injure butter at the factory more than the whole journey to the English market at the proper temperature, and I will venture to say there are very few creameries which have the accommodation for keeping butter at a proper temperature until it can be shipped. I, therefore, wish to encourage the establishment of these cold storage facilities at the creameries, and for that purpose have offered a bonus of $50 the first year and $25 for each of the next two years, amounting in all to $100, to any creamery that will establish and keep up a cold storage for the next three years. The next thing to do is to see that there is accomodation on the railways of the country to carry this butter in cold storage cars. I have been able to complete arrangement with the Grand Trunk and Canadian Pacific railways—and I hope we shall be able to do the same with the smaller railways—to carry your butter in cold storage to the shipping points. Then, at the shipping points we propose to ship in cold storage to England. We have already arranged with one of the large steamship lines, and expect to do so with others, to provide cold storage to Bristol, London, Liverpool and Glasgow. Further, in this connection I may say I have arranged that the rates will not be unreasonable, but that they will be under the control of the Government. (Applause). I thought it was very essential that our trade in these things should not be under the control of any independent company, but that I, as Minister of Agriculture should have an arrangement that would not be subject to extortion. (Renewed applause.) I may say that I have had no difficulty about making these arrangements, but that the companies were reasonable, and I believe we shall always find these carriers reasonable if we are reasonable in our treatment of them I thought it was fair and right that I should mention these things to you. I have mentioned butter, but it is not only butter that will be benefitted by this system. Any other kinds of perishable articles which are to be sent we will be glad to take into this cold storage, in the proper accommodation provided for them. If there is fruit, or bacon or any such things to be sent, we are perfectly willing to carry them in cold storage. It is a national undertaking (hear, hear); an undertaking under which no section of the community will be favored at the expense of the others; for I believe I am one of a Ministry which ought to look after the interests of the whole people of Canada. (Applause).

Now, in connection with this question of butter and cheese-making there are one or two things I would like to say from a practical point of view—what *I* mean is from the standpoint of the actual practice on the farm. There was a discussion this morning upon a subject which I think is of the highest importance to the farmers of the country, *i.e.*, the question of milking cows milk ten or eleven months—one man remarked twelve months—of the year. Some took exception to that. I am not going to take exception. If he can make money out of it he is perfectly right to do it. Personally, my own experience has not led me to think I could do it. I have now been for some nineteen years breeding and raising cows and trying to make the utmost possible out of them. I said, at the outset, that I had been farming for twenty-five years, but the first four or five years I did not know what I was driving at I thought I could make a farmer of myself and bought a farm, and, I frankly confess, at first I did not succeed very well; but I set steadily to work with an ambition to succeed, and if there is one thing I would urge upon the farmers of this country more than another it is to have a fixed object in view. Do not change about. Do not go to butter-making one year, and then think the next year you can make more out of pigs, and then get a trotting horse thinking you can make money out of him. Make up your mind what you are going to do, and stick to it, even if for one or two years you do lose some money. You will lose more by changing. Now, in my own work in connection with dairying I find that while I can make cows—some of them, the best of them, perhaps—milk twelve months of the year, I do not find

that the first three or four months after calving the second time they will give me so much milk as if I milk them only ten or eleven months. I believe that the strain of milking and breeding without end is an unfair request to make of the female mechanism. (Applause.) I believe that a rest of a couple of months is not only right and humane, but profitable to the owner. I weighed the milk of my cows for years before I got a Babcock test, and knew just what they were doing, and I have observed that the cow which milked for twelve months after her first calf did not give so much milk the next year. She could stand it for one year, but I do not think she could for a series of years, and, even if she did you would have to watch very carefully to see if the milk of the last two months did not cost more than it was worth. While saying this I do not wish to say for a moment that farmers should not have milk all the year around They should. No farmer of the present day, with the present knowledge and capacities of our people, ought to be in the position which I tell you frankly the farmers of my section were ten or fifteen years ago. I have gone into a neighbor's for tea and he had no milk on the table, simply because every cow in the barn was dry. That was not uncommon, and yet these were pretty successful men. I would advise you to give your cows a month or two's rest, but do not give them all a rest at the same time. Have some cows coming in all the year around, not simply to get milk for a cup of tea, but to have milk from fresh cows for your pool of milk. You cannot make good butter in winter when you are stripping all the dairy at the same time, but if you are stripping, perhaps, half your cows and if you will feed them a few roots and some well made ensilage and some meal, I venture to say that you can make a butter in winter so that no buyer can detect the difference between it and butter made in summer. I have done it for years and you can do it.

One of the advantages of butter-making is that you can make it pay the whole year around, and no farmer nowadays is going to be content to get all the profit out the farm during the summer season. If he is going to realize the highest price for butter he can only do so by reason of the fact that creamerymen are making a good reputation for Canadian butter in the English market. The day has long gone by when the Canadian market could take up all our product, and the price is going to be regulated by what it will bring on the English market. Now, cheesemaking is impossible in winter, but if you cheese-makers will take up winter creameries, and put your butter in 1¼ pound packages on the English market you will get just so much more for it than you would for Canadian dairy butter which must be sold at home.

In regard to winter dairying I should like to say one or two words about feeding. Feeding is a problem which you have studied, but there are a great many things which we do not follow if we do know. I am sorry to say we farmers do not do half so well as we know. There are lots of farmers who will get up at a meeting and tell their experiences, but when you go to their barns the practice is not quite the same. (Laughter.) There are those too who will say, "We understand the arguments, and they are downright true to a demonstration; yet we do not see how we are going to apply them" I do not see any practice in which common sense has to come in so much as in farming. We used to be suspicious of science; we thought the man who found out facts in his closet was no good; but to day those who are successful know better. We know that science is merely knowledge, and the man who sneers at science is simply vaunting his own ignorance. The man who says he does not want any of this book learning is simply explaining that in his own opinion he knows it all. But even Governor Hoard does not know it all, and the proof is that in his own paper every week hundreds of questions are being asked. In this country the farmers have the advantage of scientific information obtained by men particularly prepared for carrying on that work and having at hand all the best appliances that can be got with which to find out all that can be learned about this business. These men are paid by you. The staff of the Experimental Farm at Ottawa and of the Agricultural College at Guelph, the staff of the *Farmer's Advocate*, and *Farming* and *Hoard's Dairyman* are all paid to find out the true principles of agriculture, so that the farmers may reap the benefit of what they are doing. By experiments they have found just what is contained in different foods and just what the animals require, and if the farmers will just take this information and apply it in their practice in ways which are

demonstrated to be suitable to their own conditions, using that common sense and business capacity which is just as necessary in farming as it in any commercial calling, they can succeed by doing so. I think one of the reasons why our people have mistrusted the information which they have got from a book or paper is that they have tried to apply it in a way not quite suited to their own circumstances, without thinking about or understanding the difference of conditions. Supposing one of you were successful in treating a sandy soil in a particular way, would a man on an adjoining farm, with a clay soil be likely to succeed by treating his land in exactly the same way? So if you want to keep a cow to give you good milk you must not feed her to put on beef. If you are going to feed a hog to make bacon for the English market you do not want to feed just the same as if you were going to send the bacon to a lumberman's camp. In one case you want a thin, lean bacon, and in the other a thick, fat bacon. In that case also you must have two different kinds of hogs. Otherwise you are not going to succeed. So it is in dairying. If you are going to make dairying a business you want to buy a dairy cow, or, better still, raise one, for it is very hard to buy a good dairy cow. If you want a good dairy herd there is just about one way of getting it, and that is to buy a first-class bull and breed from him. It will take only about five years in this way to get a dairy herd. But you must remember one thing, and always keep it before you; if you are trying to raise a dairy herd do not buy beef animals. Keep to your dairy animals and let the men who are raising beef keep to the beef animals. I am quite in sympathy with the men who are raising beef under the present circumstances, although I do not think their business is dead or not to be revived. We find even now there is an abundance of the best beef required, and it is very hard to get a good piece of beef steak. Still there are cattle which have had applied upon them science, knowledge, experience and skill for generations, for the particular purpose of making milk, and are we wise if we throw away all that knowledge and skill accumulated for our benefit? No; if we are wise we will take advantage of it. Yet in going through Canada I find a terrible mixture of dairy cattle. In many cases farmers are using a big raw boned bull for dairy purposes which has none of the characteristics of a dairy bull. I wish to say that the dairy bull is necessarily fine and delicate in build. The dairy breed needs just as great a fibre as the beef, but in a different direction, and it is requisite that certain characteristics should be noted well. What I like to see on any farm—and I think I could fairly judge a man's capacity as a breeder in this way—is a lot of cattle uniform in size.

Now, I have touched in this rather desultory and rambling way on a few principles in connection with dairy work, which I do not presume to lay before you as information at all, but which I do believe necessary to be kept in view by dairymen if they are to be successful. I am particularly interested in ensilage, because I believe I was the first man in Canada to erect a wooden silo. I knew about the subject because I read it up, and as the principle of the silo was simply the exclusion of air, I did not see why in this country of timber we could not build a silo of wood as well as of stone or cement. That was fifteen or sixteen years ago, and from that day to this I have continued to make ensilage and to dairy through the winter, and I could not possibly make a success of winter dairying, keeping up the quantity and quality of the milk, if I did not have my silo. I tell you it is absolutely necessary as an economical factor in the production of butter in the winter season. By the addition of a little bran or cotton seed or oil cake, which will balance the ration and provide the necessary ingredients not found in corn, I find I can make a quality of butter undistinguishable from ordinary butter made when the cattle are on grass. There is nothing better to use with ensilage than a little clover hay, and I venture to say the basis of all dairy feeding in this country is and must be the growing of clover hay. Feeding corn ensilage alone I do not think is so profitable as feeding it in conjunction with other foods. The cattle cannot do so well on ensilage alone, and I would advise that at least once a day they should be fed either long or cut clover hay, and those other ingredients lacking in corn also supplied. Prof. Robertson, a few years ago invented an ensilage corn mixture which has been found excellent, viz: ensilage corn, horse beans and sunflower seeds. Before I sit down, I wish to express my gratification and pleasure for the opportunity of addressing you this afternoon.

## PLAIN TALKS ON CREAMERY MATTERS.

By Hon. W. D. Hoard, Fort Atkinson, Wis

Before entering on my subject, I wish to convey to you my gratification on addressing a Canadian audience with women in it. I have spoken to between 500 and 600 audiences of farmers in Wisconsin, and I never spoke to such an audience there that had not a plentiful sprinkling of women. Without the sympathy of women in any agitation we would be powerless. It is the wife and mother who makes the home, and it is that influence which puts heart in a man to go out into the field. Without a woman a man is like the half of a pair of shears. (Laughter.)

Now, you are about to engage in creamery work in Canada; *i. e.*, you are shaping yourselves towards it, and economy on the farm is the basis of success. You must lay that foundation good and strong. How is it that you cannot get cows to give milk in the winter, when you are feeding them at the largest expense? After this the cows must come fresh in the fall; that is, the large majority of them must. But are not seventy-five per cent. calving at the present time in the spring? Is that not true? Now, that is wrong; it is wrong for your best profit I mean, for this reason: You had better have seventy-five per cent. come fresh in September and October, for the cow will give 1,000 to 1,500 pounds of milk more throughout the year than if she comes in in the spring. Why? Simply for this reason: At the end of six months after calving she has come to the shrinking period. If she calves in the spring, in the cold weather she will dry off, for there is everything to make her milk shrink. Perhaps the owner is stingy and does not like to feed hard. It will take only ten or twelve per cent. more food to feed her properly, and the product will be worth thirty per cent. more than what she consumes. At the end of six months from her coming fresh in October and September she strikes the expanding period. She will have fresh grass, warmer weather, everything tending to expand the milk flow—not everything tending to contract it. That is the basis. If you are going to make butter in the winter you must have fresh milk in the winter. Then, see that your heifer comes in, in the fall, and with a heifer starting that way you will have no difficulty afterwards.

### The Care of Milk for the Creamery.

A great deal might be said on this very important question, for seventy-five per cent. of the success of the creamery depends on it. But where too much is said too little is remembered and assimilated.

The following brief set of rules comprehend in the main all the principles involved:

1st. As soon as milk begins to sour the cream stops rising, and it cannot be thoroughly separated in the centrifugal; therefore keep it cool and sweet, lest you lose your own butter-fat.

2nd. If you cannot keep your milk cool and sweet in hot weather, don't try to patronize the creamery.

3rd. This can be done by thoroughly aerating the milk; keeping it in a cool airy place; throwing over it a wet woolen blanket, and frequently wetting the blanket: keeping it in cold running water.

4th. It can be kept sweet by thorough cleansing of the milk vessels; not allowing the milk to stand in the barn or stable a moment after it is drawn from the cow. Be thoroughly clean in the habit of milking. Thorough effort in these two directions, keeping milk cool and sweet, will make a gain during hot weather of ten to forty per cent. in the butter yield. Whatever you gain is rescued from waste. You must stop this waste; for here is where and why the farmer does not get larger dividends. Depend upon it, this is a true statement whether you see it clearly or not.

### Educational Effect of the Babcock Test. (Modern Dairying.)

The Hoard Creamery started in 1887. Test was taken of the average quality of milk for four years; first by the Curtis oil test, next by the Short test. It was found to be 3.97. April 1st, 1891, we commenced to pay by the Babcock test, and have paid by it ever since.

The old system demoralized the patron; educated him to wrong ideas, prevented him from studying the breeding and feeding problem, except for the production of the cow that would yield the largest quantity of milk, no matter whether it was poor or not.

Under the education of the test, in six months the milk came up to 4.41, and the average increase of the butter output for the following year was nearly *one-third of a pound of butter more per 100 pounds of milk.*

Where do you suppose that butter came from? I will tell you. It came partly from the stopping of dishonesty, but more from the improved care and handling of the cows, simply because every patron stood on his own responsibility.

If he neglected his cows, ill treated or ill fed them, he could not make it up by watering the milk. He must be measured by whatever measure he meted out to the cow. That was the educational effect produced on the farmer by placing himself under a logical, just system. Every man who has the power to reason, expand and grow into a knowledge of dairy truth ought to welcome such an educational force. Many there be who do not—who oppose it. Let us hope they will see the very expensive error of their way.

I have been amazed beyond measure many times at the fact of how few men there were in a factory community who would reason their way to a broad, just conclusion. A large majority would soon to be led by narrow suspicious and prejudics. So they would turn their back on the light. The farmer suffers greatly in pocket and progress if he does this. The cows suffer also. Standing in the barn yard of a Norwegian farmer one day the owner said to me in a simple yet forceful way: "I t'ink all my cows been in a bad way." "Why?" we asked. "Oh, because I not understand 'em better." What the mariner's compass is to the sailor on the trackless ocean the Babcock test is to the dairyman who would know the truth of cow life. Yet there are so many who had rather sail by "dead reckoning" in either case.

### Cost of Butter in Canada.

If I go among the patrons of almost any creamery in the land, I will not find more than one in fifty—and I doubt if I find even that—who will show me that he has taken any systematic pains to know what a pound of butter has cost him. The question might as well be in "Darkest Africa," and yet there is not a patron but could easily work it out, if he would. The creamery books would aid him greatly, as they give the total yield of milk, and the resultant yield of butter. He knows the number of cows he has: he can closely estimate the tons of hay and other fodder together with the value of the pasturage they have consumed, and the total amount of grain fed.

From this he can estimate the cash value of the food, and add the labor cost, and divide the total by the number of cows employed, and the result will be the average cost of each cow on the farm. To this add the expense of taking the milk to the creamery and the cost per pound of making the butter. Divide this sum by the total number of pounds of butter to your credit reported by the creamery, and you have the cost to you of a pound of butter. Deduct from the total milk account, the weight of butter made, making a fair allowance for waste, and you have the skim milk. Estimate this at what you think it is worth to you. Where creameries take good care of the skim milk, and prevent dishonest patrons from robbing the rest, it is worth all the way from ten to twenty-five cents a hundred pounds; depending on the price of pork and veal somewhat, and very much on the skill of the farmer who feeds it. Make your own estimate and add it to the

cash value of the butter. Here you have the total earnings of your herd of cows. Divide it by the number of cows, and study long and reflectively on the difference between the sum earned by the cow and what she cost. The sum of that difference per cow represents your ability as a dairy farmer. Try it once, and get a fair, square estimate of what you are, as a manager of your own fortunes.

Let me say right here that if your creamery does not furnish you a monthly report with its dividend, which will give you the figures on which to make the above calculation, make an effort to have it done. Men, plants and animals do not thrive well by being kept in the dark. What we all need is light. But we must not be cowardly and refuse to profit by the light. A very close calculation was made by a writer, "F. J. S.," in the *Farmers' Advocate* last year on the cost of butter in eastern Canada. He divided the question into grass butter, fall butter and winter butter on the basis that a cow gives 5,000 pounds of milk, yielding 200 pounds of butter; that she milks nine months. Labor is charged at ten cents an hour, board included.

The strictly grass butter season he puts at two months, May 20th to July 20th. The total cost for feed, labor, milking, caring for milk, churning and marketing he put at $5.80 per cow for sixty days. He then charges up to this grass butter the proportion of cost of keeping the cow three months in idleness, which is $1.33, or a total of $7.13, which brings the cost of butter produced on grass from a two hundred pound cow at eight cents a pound. The fall period he places at ninety days. For this period the cost per pound of butter is fifteen cents.

The cost of winter production for a period of 120 days with ensilage used, is placed at twenty and a half cents a pound.

*Cost of the Year's Butter.*

| | |
|---|---|
| Two hundred pounds of butter cost | $30 62 |
| Average cost for the year, per pound | 15⅜ |
| Cost of feed of cow, per annum | 25 37 |
| Cost of milk, per 100 pounds | 58 |
| Cost of one pound of butter (food alone) | 12½ |

The food cost of a pound of butter at the Minnesota Experiment Station where the cows averaged 6,400 pounds of milk, was ten and a half cents.

Now comes a very interesting conclusion which I wish every cow owner here to think upon, take home with him, and make of it a subject of frequent reflection for the next year. If he will, I will guarantee it will make a successful dairy man of him. Here it is: Understand that the cost of butter was fifteen and a third cents *when the cow gave 200 pounds a year.* The writer says: "Cows giving but 175 pounds of butter—only twenty-five pounds less—would make butter costing *nearly three cents a pound* in excess of the above estimate."

Here is the secret of the great cost of butter. It is the poor cow. What are the questions every man of us should ask right now? They should be:

1. How many of my cows give even 175 pounds of butter a year?
2. What have I done to know what they give or what they cost?
3. Can I afford any longer to be a mere guess work dairyman?

Go to any creamery or cheese factory on the continent and you will see twenty men haggling over the cost of making per pound where you will see one who is studying the cost of a poor cow. "What would you think of a man," said an old Yankee woman, "who would deliberately put his nose on a grindstone, and bear down at that?" The man who deliberately keeps two cows to do the work of one cow is that kind of a man.

CREAMERY ECONOMIES.

There are a great many ways in which a larger degree of economy and efficiency in creamery management can be promoted. One very important one is in bringing the daily supply of milk up to the maximum working capacity of the creamery. To take a creamery with a capacity of handling 10,000 pounds of milk a day and give it only 5,000 pounds is not only bad economy, but it results in an increase of the cost of making the butter The law of economic proportion holds good in the creamery as it does in the cow. It costs as much to support the body of a 150 pound cow as it does a 300-pound cow. It costs as much to furnish the labor, room, machinery and nearly as much fuel for the running of 5,000 pounds of milk as it does for 10,000 pounds.

Then again, there is a great waste and consequent increased cost per pound of butter in having a large number of patrons and not a corresponding increase of milk.

Here is a case in point with three creameries, two in Iowa and one in Minnesota. The Luana creamery, Iowa, has received as high as 48,000 pounds of milk a day. They use five separators, employ twenty milk haulers, four men in the creamery and two coopers, and have three hundred patrons.

In the same State the Strawberry Point creamery has taken in as high as 48,657 pounds of milk a day. There are 268 patrons, and four men are employed in the creamery.

The Alden, Minnesota, creamery has also reached the 48,000 pound mark a day. It has 155 patrons, and three men are employed in the creamery.

It is very evident that the Alden creamery is doing its work at the least cost, and if the butter is equally good, at larger profit, when the expense of hauling milk and cost of factory work is considered. It produces from 155 patrons about the same amount of milk that is produced from 300 at Luana, or 268 at Strawberry Point.

A part of this economy the patron is responsible for, that is the amount of milk milk delivered dai'y. This important fact should always be considered when starting new creameries or cheese factories. Every community of farmers should consider that it takes about so many thousand pounds of milk daily to pay the running expenses; then an additional number to pay interest on capital and maintain repairs. A well appointed creamery and ice house, the whole built as good as it ought to be, will cost not far from $2 500. The debit yearly account against this property will stand as follows:

| | |
|---|---|
| Interest at 6 per cent | $150 00 |
| Annual depreciation and repairs 10 per cent | 250 00 |
| Labor of good butter-maker and assistant | 800 00 |
| Fuel | 275 00 |
| Oil, lights, incidentals, etc | 50 00 |
| Total | $1,525 00 |

In ordinary practice it requires one pound of good coal to separate fifteen pounds of milk, but the cost of firing up is as great for a small amount of milk as a larger. It costs the Hoard Company $390 a year for fuel in a creamery that averages 8,000 pounds of milk a day, and we pay more for help than I have allowed here.

I think the above figures are conservative. Now, to meet the bare expense of existence, the creamery must make 105 pounds of butter a day at four cents a pound, as the daily expense is within a slight fraction of $4.17 a day. To make this amount of butter will require at least 2,500 pounds of average Canadian milk. If the price of making is less than four cents a pound the patronage must be greater. Now, this general outline of calculation will serve to show all concerned in establishing creameries that there is such a thing as an economic limit, below which it is not safe to go.

The history of the creamery business in the United States is marked by numerous instances of failure. There are thousands of idle creameries to-day, because the farmers among whom they were planted did not understand the application of economic principles, and that the success of the undertaking rested on them. The creamery sharper

would come among them, tell wonderful stories of the profits that would accrue from such an institution in their midst, get them to subscribe stock to the amount of double what a good creamery should cost, take a thousand dollars of the stock himself and leave with his ill-gotten booty. These farmers were not dairymen, even in any sense of the word. The whole enterprise from beginning to end was built on what they did not know. Whether the creamery is co-operative or proprietary, the principles of economic management hold true just the same. Here again we see that this dairy business is one which requires close discriminating intelligence. What a lot of men there are in it who are afraid they will know too much. (Applause.)

## GRASSES.

Dr. James Fletcher, Dominion Entomologist, of the Central Experimental Farm, Ottawa, followed with an interesting address upon grasses, which will be found in the Report of the Eastern Dairymen's Association.

## A THREEFOLD CONCENTRATION—THOUGHT, EFFORT, MEANS.

By C. C. James, Deputy Minister of Agriculture, Toronto.

A short time ago I received a copy of an English illustrated monthly, devoted entirely to a history of the long reign of Queen Victoria. It was fairly illustrated, giving views and scenes in connection with the Queen's life from the time of her childhood, but more particularly was it illustrative of incidents over the sixty years of her reign, and accompanying that magazine there was a supplement upon which was printed a very fine portrait of the Queen. This was an English magazine. It was particularly devoted to an event that appealed specially to the British people, and yet in the lower corner were the words, "*Printed in Germany*"! Now there was a whole sermon in those three words—the fact that an English company preparing a publication dealing with the long life of England's noblest Queen, should send out broadcast to the world that sentence printed upon their publication. What is the explanation of it all? Germany has for twenty-three years been making wonderful progress along certain lines of manufacture. The colored printing, of which I have just given you an illustration, is one instance of this. Now why is it that the German people have made such rapid development in these lines? The solution of it is found in the fact that they have been devoting themselves to a study of the natural sciences and their application to commercial and manufacturing life. They made a study of all those sciences which seem to have any connection with everyday life, with manufacturing life, and the result has been a tremendous development, so that certain branches of manufacturing have made more rapid progress there than elsewhere. All over England there is coming up the one opinion and conclusion, that if the British manufacturers in the future are to hold their own against foreign competition they must give renewed attention to those lines that the Germans have found so profitable.

Now we can apply this to the dairy industry, and we will find that those countries will make the greatest progress which pay the most attention to scientific investigations of the dairy question and the application of scientific principles to the work in hand. In connection with the application of the most scientific developments connected with dairying, this Association has taken a very deep interest. It is ten or eleven years since it was organized. It began its work just about the time when dairying assumed a new shape. This Association is one of the means adopted in this Province to improve, more particularly, the butter industry of Ontario. Perhaps you will allow me, for a few

moments, to refer to the past work of the Dairy Associations of this Province, and I wish to do this especially as on several occasions the statement has been thrown out that this is the winding up and death of the Creameries' Association, and I am afraid many people have carried away the erroneous idea that henceforth there is to be no more work carried on in connection with the great butter industry of this country, but that cheese is to receive our whole attention. It is now about thirty-four years since the co operative cheese factory system was introduced in the Province of Ontario, and rapidly these factories grew up until there was established so large a cheese industry that it was felt necessary to have an association for the united interests of those engaged in this matter. Then there came out of that desire the formation of the Dairymen's Association of Ontario. This was, later, divided into two associations. Some years after that there was introduced the first creamery in the Province of Ontario, and attention was directed by the people of the country to this new industry, until finally the making of butter in special factories or creameries became of so great importance that it was felt necessary to have an association to look after the interests of the creameries. Hence there was formed the association known as the Ontario Creameries' Association, which was organized, I think, in 1886. These three associations have been carrying on this work, and I do not know whether the people of Ontario will ever appreciate how much these three associations have done. Those of us who have had our attention directed to it fully appreciate the work that has been performed. And there is no exception. All three associations have worked equally well for the development of this great industry. But what has been going on meanwhile? There has been introduced into this country winter dairying; so that in a great many cases the men making cheese in the summer are also devoting their attention during the remainder of the year to the making of butter. So there has been a coming together of the forces interested in these two great industries. Now it is the exception to find a dairyman who is interested only in the one. It has been found, therefore, by a number of men in this Province that the three associations were gradually taking up and covering the same work, that their conventions were carried on in the same way, that there were three lists of directors, three sets of officers and three lists of speakers, delivering the same addresses at the three conventions. It was thought if that could be avoided and a saving in money effected which could be used in improving the two interests in other ways it would be a good thing, and so the experiment is to be tried, and the result is not that this Association drops out and that the two others go on; what is really being done is that the three Associations are being dropped, and the two new Associations to be formed will be known as the Butter and Cheese Association of Eastern Ontario and the Butter and Cheese Association of Western Ontario. I believe it has been decided to adopt for the present year the officers of the Eastern Association elected last week at Brockville, and in order that the creamery men might be protected in their interests some men have been taken in from this Association and made their officers. In fact the nature of the Board of Directors will be known when it is stated that the President of the Creameries' Association is made the new President of the Eastern Association. So I think we may expect that from now on, with men interested in the three old Associations, the work will be carried on with renewed interest, and that whatever rivalry there may be, or may appear to be, now, will be largely removed, and that there will be only a friendly rivalry between the eastern and western parts of the Province, which we hope will result in improvement to both.

My attention has been directed from time to time in reading the daily papers, to the wonderful boom that is being worked up in this Province over our mineral resources. You find column after column in the press about the wonderful schemes that are to make everyone rich, and it would seem that Canada has been asleep for the last twenty or twenty-five years, and has been neglecting the greatest resources of this country, and one would think, too, that our future depended upon their development now. I have nothing to say against developing our mineral resources, I believe they should be developed, but I have this to say: If we could only arouse one-quarter the same popular interest in this matter of dairying with which we are associated and which is of far greater importance

than all our gold and silver mines, it would set the newspapers aflame in regard to it, and there would be all over this country such a demand for the improvement of this industry as would set us far ahead of any country in the world.

The total mineral production of Ontario last year was a little over five millions of dollars. We produced last year ten million dollars worth of cheese and one million dollars worth of creamery butter, and six and a half million dollars worth of dairy butter, and if to that were added the milk sold in towns and cities and the skimmed milk and whey and buttermilk, to say nothing of the effect of feeding by-products, you will find that you will roll up a grand total of twenty five to twenty-seven millions of dollars. Now, those people who talk about the future of the country being dependent upon the minerals surely have never looked into what the dairy industry has been doing, and it will take a doubling, and trebling, and quadrupling of the mineral output of British Columbia and Northwestern Ontario before they are brought to anything like the dimensions of the dairy interest of this country. (Applause) Some one may say, "But the gold and the silver are all dug up out of the earth." Well, where does the butter of the country come from? Mines have been exhausted in this country before. There was one little island up in Lake Superior from which they took over three million dollars worth of silver some years ago, but the mine is now closed. And so with many other mines, just as with our timber resources, and our fishery resources and some other resources. But in dairying we are drawing upon a source that is inexhaustible. Now, if any of you are acquainted with even the simplest rudiments of chemistry you will understand the point I am making. Butter—what is it? It is a compound containing three elements—carbon, hydrogen and oxygen. Where did it come from? Out of the milk? Where did the milk come from? Out of the products of the farm. Where did the farm products come from? Out of the soil and the air. But the three constituents out of which butter is formed—carbon, hydrogen and oxygen—came not from the soil but out of the air and water, and the water of course came from the rains, that is out of the air. These are free for all. So that every time you sell a pound or roll of butter you are selling so much which the animal took from the plant and the plant took from the air. I say we are drawing from an inexhaustible source. So if you say that developing these great mineral resources is nothing but drawing upon the resources which nature has provided in almost inexhaustible quantities, I say that in advocating dairying we are only encouraging something which is inexhaustible. Gold out of the soil will not pay this country as much as butter out of the air will pay it.

Then, mining, in many cases, tends to unsettle the community. What is the result of a mining boom? There is a rush of the people away from the comfortable homes to those bleak, and, in many cases, forbidding sections, where mining is carried on. It has an unsettling effect which does not tell for the best interest of the community. What does dairying do? It simply ties a man to his own country and to his own farm and family, and, if it is being carried on intelligently, those engaged in it are being made satisfied and contented citizens, and I think it is of far greater importance that we shall encourage our peace loving, law-abiding citizens on the farms than that we should encourage a mining boom. The development of our great mining resources will mean that where one man will get rich a thousand will fail. It is not so in connection with dairying, which tends to build up the whole community. In mining, here and there, perhaps, a man, by his shrewdness, may so regulate his buying and selling as to make a considerable amount of money. As a rule the profits of dairying are more evenly distributed among the community. It is of far more importance to this country that a large number of people shall get a fair living than that 200 or 300 men should become millionaires at the expense of the rest of the community. What has this to do with you who are here to-night? You may say, "Oh, the people around here are interested in dairying, and we must show our interest in it too by our presence." But have you ever looked into the subject a little further? I do not know anything about the history of this place, but I do know something about places further east, and probably your experience has been the same as theirs. Here, perhaps, the people have at some time voted $50,000 or $100,000 for a railway, with the expectation that it would bring them more trade and give employment to more

people, and probably the effect has been to divert trade elsewhere which formerly belonged to that place. Another town has perhaps voted a large sum for the establishment of a manufactory, on the same grounds, and it after a time has moved elsewhere or closed down. But have you ever known a case where a town considered the propriety of bonusing this great dairy industry? I understand that in this immediate vicinity you are fairly well supplied with cheese factories. Supposing that within a few miles' radius of the town of St. Marys, in addition to what cheese factories you have already, you had four or five well equipped creameries running the year around, what would be the effect? Suppose each of those creameries were making butter from the milk of 500 or 600 cows, what would be the result? A large amount of work would be done by them which is now being done on the farms, and there would be produced a more marchantable article which would bring back a larger amount of ready cash. That would naturally circulate in the town of St. Marys. It seems to me that if a number of cities and towns in this country would stop looking to the building of railways and factories to bring them prosperity, and would cast their eyes on the country round about and strive to establish some industry that would increase the output of the products of the farm, they would meet with much more success. They would thereby increase the wealth of the community and provide a larger amount of ready cash with which to do trading in the towns. So it seems to me that you citizens of St. Marys have quite as much interest in this matter as have the patrons of cheese factories and creameries, and that the people who have means in our towns and cities should consider the advisability of putting some of their spare cash into the development of this industry. This is a most opportune time to engage in this business, as there never was a time when the prospects for transportation were so favorable.

But, you ask, can this industry be developed? I gave you figures a while ago to show that there was one million dollars worth of creamery butter and six and a half million dollars worth of dairy butter made in this country last year. What is the condition of this dairy butter? The creamery butter on the average is worth several cents more per pound. If all this dairy butter had been made in creameries, besides supplying our own market at a higher price, we would have had a very respectable surplus to ship to the old country. So if you will look into this matter from all points you will find that it is one of the most favorable fields for development. If we could only bring this question to the attention of the people of this country as it ought to be presented to them; if we could only induce the press to devote attention to it instead of the development of wild cat mining schemes, we should arouse public interest to the importance of the dairy industry; we should have more capital diverted to a channel which would give us a first-class dairy article for the old country market, and ensure a steady return of money, which would find an even distribution over the whole community. That would ensure more general prosperity than the interest in mining which now seems almost uncontrollable throughout this country. The main thing accomplished by meetings such as this to-night is not only to create a healthy and wholesome interest on the part of the farmers of the community, but to awaken also the interest and sympathy of the townspeople in this work, and we would ask you to back up those who are struggling to develop the butter industry by investing in creameries in the neighborhood. (Applause.)

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Mr. James Fletcher, Ottawa, delivered a brief but interesting address on "Beautifying Our Homes," in which he dealt with the culture of house plants.

Hon. W. D Hoard followed with a humorous address, largely made up of personal reminiscences.

## OUR AGRICULTURAL ADVANTAGES.

Hon. SIDNEY FISHER, Dominion Minister of Agriculture, Ottawa, was received with applause on again rising to address the Convention. After a few preliminary remarks he said: I would like to say a word or two to-night as to the opportunities which agriculture offers in this country and to hold these up for a minute or two to your gaze. Especially would I call attention to the dignity of that calling.

The old days are passing away, very rapidly, when the people of this country and continent had the idea that the farmer was simply a drudge, who necessarily had on large cowhide boots and was slouching in his gait, and who knew nothing outside of his own particular calling and immediate neighborhood. That day has passed for good. I thank God it has passed away, not only because the passing of it away is an evidence that our calling has attained a higher dignity, but also because it shows that we have acquired a power and knowledge and experience, which, however, we are to use to a great deal better advantage than in the past for the upbuilding of our country.

To-day we have abundant opportunities for the education of our young farmers, and I venture to say there is no calling in our country in which education is more necessary than in the business of agriculture. It is true that even yet a great many people engaged in other businesses think that a high school or college education is not necessary for a farmer. In this connection I was once rather amused by a remark made by a professional gentleman to myself. He had heard me speak at a meeting and was afterwards introduced to me, when he said: "You are a lawyer, are you not?" "No," I replied "I am a farmer." "I know you are a farmer," said he. "but you are a lawyer too?" "No," I said, "I am nothing but a farmer." He seemed to think I was hardly a farmer, because I could speak correctly and was dressed as well as he was, I suppose. That idea is passing away, and one reason is because of the opportunities there are to-day for farmers' sons to get a first-class common and high school education, and also because we have educational facilities for arming ourselves with and applying to our industry the knowledge which has been acquired with reference to the secrets of our own particular calling. I want to congratulate you upon the fact that in this Province you have one of the most celebrated and perfect institutions of learning for that purpose which I suppose exists on the face of the earth. I refer to the Agricultural College at Guelph. I want to say, for the rest of Canada, I envy you that institution. Time was, I know very well, when the Agricultural College was not in favor with the people of this Province. Time was when there were those who thought the money spent upon that institution was being wasted. But they were mistaken. Even if at one time, when it was struggling for an existence, it was not so thorough in its management and complete in its curriculum as now, its success to-day is largely the result of the work done then. A good many years ago I had an opportunity of visiting that institution, some years later I visited it again, and the other day I visited it once more. In the last five or six years a complete revolution seems to have taken place in that institution of learning. An enormous additional amount of facility for carrying on the work has been provided, not only for the purpose of imparting learning pure and simple, but for conducting experimental work, the results of which are distributed broadcast among the farmers of this country. Over and above all, however, there is the opportunity for the young men who come from the farm to acquire a scientific education which they can apply to their life work.

You know very well that in the past our young men were encouraged to go to the high school and university, and almost obliged by their training there to go into one of the learned professions. The influences were not such as would make a young man's thoughts turn in the direction of the farm, they were not such as would make him understand and appreciate the beauties of the calling in which he was born and brought up; they rather seemed to seduce him from country life and lead him into the towns and cities. To-day, if a young man chooses to go to the Guelph College instead of to the university, he has an opportunity for obtaining the very best training for his life on the farm. This is an

advantage, and especially an advantage in a country like Canada, where the whole basis of our prosperity and social structure must be agriculture. It is impossible that we should be like the Old Country and become a busy hive of manufacturing industries. We have a country which spreads over a great extent of territory, and although our mining and other industries may be developed, still for a great many years to come the bulk of the people must be tied to the land, making their money out of the land. Then, it behooves us to see that they are equipped with the highest skill in their calling. This cannot be done by nature. It is necessary that they should possess an exact and thorough knowledge of scientific principles and the proper application of those principles to the work they are called upon to do.

It is true hundreds and thousands of farmers have done a profitable business without knowing anything about these principles, but they had advantages which their sons and grandsons will not have. They had a virgin soil, they were within easy touch of the market, they had not the keen competition there is to-day from all parts of the world—the means of communication with all parts of the world were not such as they are to-day—and in consequence they were able to make a competence out of the soil. To-day the keenest competition exists in the agricultural world, just as it does in the industrial world, and it is only by the application of the most profitable methods that the industry can thrive. To-day, when we have the cheap labor of Asiatic countries and those of South America thrown into competition with that of our own country, in our colder climate where our needs are greater, it is only by the most correct system that we can make a profit out of the soil.

In this Province a great educational work has been done. There is still room for more. I am proud, as a Canadian, of your institution at Guelph. I am proud, and you ought to be grateful, for the great system of Farmers' Institutes which you have in Ontario. By their instrumentality the results of the work done at the Guelph College is carried out and spread broadcast over the Province.

I believe the accommodation at Guelph only provides for about one hundred students at a time. That is a comparatively small number for this great Province of Ontario. I have no doubt it will be increased in the future as the work is required of it. However, the information imparted there is, by means of these Institutes which you have all over this Province, carried to men who perhaps are already past middle age, who are no longer school boys, who cannot go to college, but are thus able to a great extent to reap the advantages of this education.

I am satisfied that is one reason why the people of Ontario take the lead in Canada—take the lead, I may say, on this continent, and I say this with all due deference to our friend, Mr. Hoard, because I do not think there is any part of the continent where the people are more advanced or better educated than in this Dominion of Canada, and I do not think there is any part of Canada more fortunate in its resources and education than this Province of Ontario.

But let me remind you that a great deal is being done in this Dominion outside of Ontario, and I would like to draw your attention for a few minutes to other parts of Canada in which I am interested equally as much as in this great Province of Ontario. Canada to-day is not simply one Province or another Province, but it is a chain of great Provinces which bridge the continent from ocean to ocean. It is a territory vast in extent; it is a territory rich in resources and capabilities; and it is well that the people of one part of our country should know a good deal—the more the better—about the other parts of their own country. I cannot too emphatically remind you that Nova Scotia, on the east, and British Columbia, on the west, are just as much parts of our own country as are this town of St. Marys and Province of Ontario.

Now, I will take you for a moment down to the sea, and, while Nova Scotia, perhaps, is not endowed with the agricultural wealth which you possess, it has in addition great wealth in its minerals and sea coasts. The farmers there are often fishermen too, and the result is they are not always as good farmers as you are. My experience is, that to make any business successful requires one's whole attention, and the farmers there are

not so much absorbed in agriculture as they ought to be to make it successful. Nevertheless, within the past few years there has been a great deal of development in this direction in the far off Province of Nova Scotia. In Antigonish and the far famed Valley of the Annapolis the farmers are becoming more successful from year to year.

Again, the little Island of Prince Edward, which lies in the Gulf of St Lawrence, is most eminently favored as an agricultural country. I do not think there is any part of even this favored Province of Ontario which has as good land. In the old days the people there used to grow oats and sell them to the United States, and potatoes, of which they made starch, selling them as low as twelve and fifteen cents a bushel. They found this was rapidly depleting the fertility of their soil, and within the last few years, having had it pointed out that there was an excellent opportunity for dairying, they have been making butter and cheese, and last season exported a large amount of cheese, which has compared most favorably with that from the west. They are now running a large number of creameries through the winter season, thus showing their faith in our methods. In fact they have a system which has been worked up until to-day it is not behind yours in this Province of Ontario. They have had the sense and capacity and quickness to seize upon the advantages of your your system and to start where you and I had left off.

Then, we have the Province of New Brunswick, studded with timber, and the Valley of St. John and neighborhood with its great sea coasts. Here, too, is agricultural land, and here too dairying is being worked up successfully.

Come again to the Province of Quebec. In that province there is a great agricultural development taking place. In certain sections of that province, which it is only a few years ago since railways penetrated and the agents of agricultural implement manufacturers have found their way to, the people have seized upon new ideas, and with a quickness and an enterprise which I dare say you would have hardly expected from them, and which I dare say you can hardly believe now, they are making strides forward far more rapidly than you did a few years ago, and if you do not take care they will overtake you and beat you at your own work. I do not say this in any spirit of boasting. I only say it because right beside you there is a development taking place which perhaps you know little about, and which it would pay you to take some lessons from. In Quebec dairying is not the only agricultural industry. That province, I know, is not supposed to be so fertile as this Province of Ontario, but when I tell you I have driven many miles and seen the most magnificent crops I ever set eyes on, and that the same crops had been grown on that land from the day it was first cleared of the virgin forest and brought under cultivation, without even a spoonful of manure having been put upon it, you will realize its wonderful fertility. It seems to be inexhaustible, and from year to year and generation to generation, the farmers have been able to make a profit by cutting hay from the same fields year after year. Now, this is no romance. It is a well established fact, and truly a fact, that it is a wonderfully fertile country, which apparently no bad system of farming can possibly exhaust. The fact is that in those parishes there is not a farm known to be mortgaged. The people are simple in their habits; they do not spend so much money as you do, and every man of them has a bank account, and as much as he wants to live upon from the soil, and that is the best of riches In my own district we have a picturesque country, with rich herbages, and springs bubbling up everywhere, affording abundant opportunity and splendid capabilities for dairy work. We there have changed our methods, too, in recent years. We have adopted the co-operative system of dairying and have benefited by doing so. Knowing the success with which the work of factory inspection in Ontario was attended, we thought we would try to go you one better. We have therefore adopted a system of what we call "local inspection." We have the province covered by a system of syndicates, there being in each syndicate not less than fifteen or more than twenty-five factories. Each of these syndicates engage an inspector, whose business it is to go about from factory to factory, testing the milk and seeing that the whole business is properly carried on. Last season there were twenty-five inspectors engaged in this work, with twenty eight syndicates, and twenty-one or twenty-two factories in each syndicate. You see what a large number of factories in the Province of Quebec are thus watched and inspected. It is a most valuable aid to our

industry, and we have found, as a result of the banding together of factories, that when a buyer goes into one factory in a syndicate he knows that the cheese is the same throughout the whole of the factories in that syndicate. Further than this, the syndicates have arranged among themselves that they will not sell a pound of cheese unless the quality is accepted at the factory. They go further again; they have passed a resolution among themselves that if a patron brings milk to one factory which has been refused at another it will not be accepted. In this way the syndicate has an almost complete control over the quality of its milk, and the result is that there is a uniform quality of cheese at the factory. This system, I think, has contributed more than anything else to the great advancement which has been made. Considerably over half our factories in the Province of Quebec are running all the year around.

Passing over this Province of Ontario, let us take a step to Manitoba. The great product of that Province is grain, which the farmers grow with an ease which reminds of the old days when we found wheat a profitable crop in these older provinces. Last season our farmers here realized better prices for their wheat than they have done for some years. At the same time I hope that will not tempt them back into the old ways when they depended on growing grain. Even in the Province of Manitoba the farmers do not depend upon grain growing so much as formerly, but are going more into dairying and stock raising, and I am glad to say there is a wonderful improvement in that respect. Then, all through the Saskatchewan country and along the Canadian Pacific Railway, in many a favored spot throughout the Northwest Territories, there are people getting together herds of milk cows and reaping the advantage of the rich herbage and making excellent butter.

A little further on, across the Rocky Mountains, we find the great Province of British Columbia, in the mind of everyone to day because of its rapid development and probable enormous productiveness as a gold country. It will be essentially a mining country, and population will flow into it rapidly, just as was the case with California during the gold boom of 1849, and, later, as was the case with Australia, when people went there from all parts of the world. So I believe in the near future British Columbia is going to reap the benefits of its wonderful mineral resources. Now, when people go there they must be fed. Making money quickly and readily, as gold miners do, they will ask for the best of everything, and it is the agriculturists of Canada who will have to supply them. British Columbia is essentially a land rocky and precipitous, rich to mine, but at the same time largely impracticable for farming operations. But, as for centuries the deposits upon these mountains have had the sun beating upon them and the rains driving them down into the bottom lands, so there you find the result in splendid alluvial deposits capable of the very highest cultivation and production. You find there, too, a climate moist and warm, and good for the production of most agricultural products; good for the production of luscious fruits, as well as suitable for some stock raising and dairying. There is no doubt that, with the work which mining will provide, this land must soon be occupied and agriculture developed.

Having given you this sketch of the agricultural capabilities of the Dominion, let me say there is one thing which always comes home to me with ever increasing effect, viz.: that we do not make the most of our opportunities. I venture to say there is no industry in this country which is so wastefully and extravagantly conducted as farming. Our farmers are not extravagant in their household expenses, but the way in which they conduct their business, I say, and say it emphatically, they are extravagant and wasteful. I have not at my finger ends just now the exact figures, but it takes at least 100 acres to maintain a family in Canada. Some of the land may be rough, and may be the farmer does not hire much help I will just give you a contrast, by showing what is the state of affairs in Holland. The other day I was looking over the condition of affairs which a committee found in that country. The average farm in Holland is twenty acres in extent, and this committee found that a whole family, with generally one, and very often two, hired help lived on the product of that twenty acres of land. A farm of twenty acres supports eight people on the average. These are people who devote themselves entirely and wholly to the cultivation of that land and work up the crop into a finished

product. Now, I do not mean to say the people of Canada are going to attain to that in the near future. At the same time we should adopt a more intensive system of farming, and that educational system which I began talking to you about to-night will help to bring about that result. I look forward to the time when in these eastern Provinces we shall be able to support treble our present population, and this would be easy if our people made ten-fold as much out of the land as they are doing now.

I have spoken longer than I had intended, but feeling very strongly, as I do, about these matters. I could not help bringing them before you, and I ask for your sympathy and support in the efforts which I, as an official of this country, am putting forth to try and work out these problems.

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Professor ROBERTSON followed with an address on "Bread and Butter," which will be found reported in the proceedings of the Western Dairymen's Convention.

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## SCRAPS.

BY PROF. J. W. ROBERTSON, DAIRY COMMISSIONER, OTTAWA.

In opening the speaker said his address would be composed of the scraps left over from yesterday. He continued: I find there has not been very much said about butter packages, and it is highly important that the Creameries' Association should somehow or other give to the butter-makers no uncertain advice upon that subject.

The ordinary large package for commercial purposes should be square and not round. It costs less money, carries the butter quite as safely, takes less room on board ship and pleases the ultimate consumer better. During last summer, butter of the same quality would fetch in Montreal about one and a half cents per pound more in square boxes than in tubs, and the whole cost of the square box is less than one-half cent per pound of butter contained in it.

We want to get the preference for our butter from those who are willing to pay the highest prices and to secure the best class of customers. The appearance of the packages should be attractive in every way. It will not pay to save five cents on the package and lose, perhaps, one cent per pound on the butter. This means fifty-six cents loss on the package, and it means also losing the best class of customers. You cannot induce good customers to take an article that is new to them unless it is attractive in appearance.

It would pay creamery men to go a little further than they have been going, not merely to have a square, nicely made package, but to put a canvas bag on the outside of of each package before it leaves the creamery. The men in Montreal put one on when it gets down there, but that is not so useful as it would be when the package is newly put up and is quite clean. The cost is not more than from three and one-half to five cents a package. Attention to these little things will help a creamery to a good reputation from the beginning.

Every package should be lined with thick parchment paper. The paper that has been used in this part of Canada has been altogether too thin in most cases. It costs less than three-quarters of a cent per box to do this, and I have lost as much as two cents a pound on some boxes that were lined with inferior paper. Over in England, you know, if you give a man the least edge of the point of a peg he will hang arguments on it against you by the million. Do not, as creamery men, accept any paper from anybody because it is cheap. Get not merely a strong paper but one of the thickest papers you can get. Thin paper will stick to the butter and you cannot get it off to leave the surface of the butter with a sparkling appearance. Have two long pieces to go around the box lapping over each other at the corners and on the top.

In the packing of butter it is highly important that the weight should be as marked on the box; and fifty-six pounds is the weight that is wanted—half a hundredweight of 112 pounds. You should pack about fifty-six and three-quarter or fifty seven pounds of butter, for it loses in weight before it is taken out. We make a habit of packing fifty-seven pounds. The shrinkage, if the exact amount only is packed, means probably the loss of a customer who is paying the highest price on the market, as well as the loss in weight. That is one respect in which the Danes excel. Butter put in packages half a pound over weight will bring more value to the creamery than put up at exactly net weights in the same creamery. It will mean more, not merely to the creamery, but more to the country at the end of the year.

For the English market butter should never be colored in Canada, except, perhaps, between December and May, and hardly to any extent then unless for the London or Wales market. One will get a higher price for a light colored butter. If we could make our June butter with less color we would get a much higher figure for it.

In salting one should use only a uniformly fine grade, and not more than three-quarters of an ounce to the pound, even in the first part of the season. The rate should be reduced when it comes to the first week of July to half an ounce. It will please English customers better, and cause them to eat more, which is worth a great deal.

The only other observation on that subject that I desire to make is that if there are any people in this part of Ontario, or elsewhere in the Province, who want to put up new creamery buildings, we will be glad to furnish lately prepared plans. In respect of creamery buildings we have been trying to get along in too make-shift a way, and we are suffering in consequence. It is all very well to get along for a time with make-shifts, but after a while they play out and do not give the butter-maker the needed opportunities to do his work properly. I will give you an illustration. When a dairy business is entirely new there are not the same difficulties to contend with as there are after it has been going five or six years. You know that if any new pest comes in, it means labor to eradicate it. Take the potato bug, which consumes the leaves and keeps the plant from storing starch in the roots. Not so many years ago there were not many potato bugs in the world. They lived in Colorado, on a wild plant of the potato family, and because their food was limited they were few in numbers. But so soon as ever they came upon a patch of potatoes cultivated by civilized man they multiplied in proportion as they had an abundance of good food. When a creamery is put up and in operation, all kinds of germs that prey on milk products have an opportunity to thrive. There may be none of these germs in a locality at all until they are invited and encouraged by imperfect drainage. You want the creameries constructed so that they can be kept clean. It never pays a man to have a ramshackle, tumble-down, open-floored building. In a township having sixty farmers who supply milk to a factory, there is not one of these farmers but can manage to pay $100 to buy an implement to enable him to do his work. There is not one saying "I need a barn which will cost at least $500 to house my crops and stable my cattle" but could and would provide it.

What are these things worth to a man who is following dairying unless they enable him to furnish the ultimate and essential equipment for turning out the best product. If each of these men were to invest $100 in a creamery that would give you $6,000 for sixty patrons; but very often they prefer to send off that amount into some outside business and are not particular about the butter-maker's equipment. It would pay sixty patrons to put up a building of that character. Over in Denmark, where they make the best butter, there are lots of factories that cost $10,000 each. After all what is the object of an investment of $10,000 to a people except to get interest on the money? The Danes have provided buildings that will give the very best service. I need not tell you that here you can put up the very best building without this expenditure. If sixty farmers were to act together a very good creamery can be put up and equipped at a cost of $3,500. That is not a large expenditure, and it is what we need to have any success with winter dairying.

I use this further illustration—I do do not do this to show that we in Canada should follow all the examples of other people; while cultivating a dairy business, we should at the same time try to build up a larger hog industry than we have—growing swine and shipping bacon, hams and pork to the British market: In 1888—that is not long ago—that was two years after the formation of this Creameries' Association—the Danish people exported about 200,000 hogs alive to Germany. Then the German Government raised a tariff wall to keep out hog cholera. (Laughter.) People on the other side of the Atlantic have a habit of doing this; they protect their people in this way against something they do not want imported. The one example in recent years where a British statesman was led into saying one thing that seemed to mean something else, was where he said our Candian cattle suffered from pleuro-pneumonia, a disease which never existed in Canada. After Germany took this action, the Danish hog trade should have accepted the situation and ordered a respectable funeral. Instead, the Danes sent a Commission over to England to see what kind of bacon was wanted there. Then they formed co-operative associations to slaughter their hogs and cure their bacon, which they sent over to England every week or two. Every member of the associations was interested in breeding the best kind of hogs. Practically, in 1890, they began this business, and last year they sent to Britain—how much? Nearly ten million dollars worth of bacon; and they have a little country in which there are not more people than in the Province of Ontario alone. It is by going to work intelligently, and by our own labor and economical management, that we can hope to succeed. All the Government can do is to open out all those channels through which the people can work themselves to success.

The average price paid for live hogs in Denmark during the last six months was just forty per cent. more than the average price paid for the average class in Canada—a pretty big difference, you see! If our people could get forty per cent. more they would grow more hogs. As we improve the quality of our products, there will be a greater demand for them, and we will go on increasing our trade.

We should increase our manufacture of creamery butter from one and a half million of dollars worth per year to eight or nine million dollars worth, and our hog trade at the same rate. If we got as much from butter and hogs, respectively, as we do from cheese, we would all be better off. That is not a far-off probability. Of the 75,000,000 pounds of butter made in Canada last year, we only exported 10,000,000 pounds and consumed 65,000,000 pounds at home. We paid just enough for the great bulk of this butter to keep it here. If every cow gave ten per cent. more butter than she now gives there would be ten per cent more butter sold, and that would add 7,500,000 pounds to our exports of butter.

The PRESIDENT: To my mind, this is probably the most valuable address we have had during this Convention. If we would pay more attention to the advice of Prof. Robertson, we would be better off. Our increase of a million dollars in the export of butter for the past year was due more to the efforts of this Association, directed by Prof. Robertson, than to any other course. If we would follow the advice which he has given us this morning, by getting an improved package, improved paper, and by getting a supply of the best butter into the market regularly, we could easily take a million more of English money next year, and if a portion of that money were distributed in this locality, I am sure everybody would be satisfied—(laughter)—everybody would be benefited. Everyone is interested in raising the standard of our goods so that the people will have more money for them.

A MEMBER: Suppose that we leave the cheese-making and go into butter-making, can we not overdo the thing so that the price of butter will come down?

Prof. ROBERTSON: One has always to take his chances in the competition. The consumption of cheese is not growing fast. People are eating cheap canned meats and jams and jellies instead, and they eat bread and butter with these. The consumption of cheese is rather falling off and the consumption of butter is going on, so, looking at the trend of events in England, there will be an increasing demand for butter for some years. If we continue to make as much cheese as we are making now, I believe we will get about the

same price for it as we have been getting. The price for our supply of creamery butter does not improve fast because of the supply of dairy butter and oleomargarine in the markets. The importation of oleomargarine into Great Britain is very large. That has taken the place of the dairy butter we used to send. Now, the cows all around the world are being used for either butter or cheese. An increase in the quantity that comes hereafter will have to come from the improvement of the cows and the increase of their number. This point is vital, because the population of the world is growing ten per cent. faster than the number of cows. It is also true that there is an increased consumption of milk in the cities. In the course of a few years it appears as if England will make almost no butter at all, but will require all the milk produced there for the cities for table use. I think the demand for butter will go on increasing.

A MEMBER: Would you advise having a brine in the space between the butter and the top of the box?

Prof. ROBERTSON: No; I would have no brine. I would have two thicknesses of paper on top and no plaster of salt. I would have the butter come just to the top of the box.

A MEMBER: Last season I had boxes that would hold fifty-eight to fifty-nine lbs. easily?

The PRESIDENT: Have your boxes made to hold fifty-seven lbs., and if they are not exactly suitable in every respect I would send them back. I would have the butter packed so that the lid would screw at least down to the top of it. For another thing I would have a better paraffine paper on the inside. I would put up butter to beat any Dane in the world.

Mr. R. J. GRAHAM: I may just say that the Firstbrook box is not a proper box. I shipped some butter to England in it and they seriously complained of it over there. The trouble is that it is smaller at the bottom than it is at the top. They called them pyramids, and sent me a sample of the Australian package.

The PRESIDENT: I can give you the name of the firm that makes the best box in Canada—William Rutherford & Sons, Montreal.

Mr. AARON WENGER: It strikes me their box holds seventy pounds.

The PRESIDENT: No, seventy-eight or seventy-nine pounds.

Prof. ROBERTSON: In my office I have samples of many of the boxes made in Canada. I have bought from Firstbrook Bros., in Toronto, nearly 4,000 boxes, all quite square—excellent boxes, that gave excellent service and pleased the customers in England. Then I got boxes from this other firm that was mentioned, and they were equally good and pleased the customers equally well; and the same with the boxes of another firm which I tried. With all due deference to our President some markets in England want a square box—the same size at the top and bottom; others prefer a box that tapers, perhaps half an inch, so that the butter comes out easily. I prefer that you should buy your boxes in Western Ontario. I will send a sample box to any factory without any patent charges. I would patronize a local man even nearer than Toronto if he can make the boxes required.

A MEMBER: What wood do you prefer?

Prof. ROBERTSON: Spruce first, British Columbia cedar next.

Mr. WENGER: How is soft maple?

Prof. ROBERTSON: I have not tried it, but I find that such woods generally warp and are hard to dovetail together. Do not be beguiled into buying the material for the boxes all ready to put together at the factory and then nail them in the factory. You may lose twenty-five cents on the package on account of appearance. In all woods have the box waxed inside with melted paraffine. Then the butter will get to the market in its best condition.

Mr. GRAHAM: Does basswood warp?

Prof. ROBERTSON: I have tried it, and poplar as well, because we have some of those woods in the Northwest. These do not have so nice an appearance as the spruce boxes. The spruce boxes have given us the best satisfaction so far as we have gone.

A MEMBER: I have been practising as a veterinary since 1858, and wish to substantiate what Prof. Robertson has said about the stock of the Canadian farmers being free from pleuro-pneumonia. I wish to say that I have never seen a case in Canada. I know of no country so free from contagious diseases among stock as Canada.

Mr. WENGER: What style of package do the Danes use?

Prof. ROBERTSON: They use a white wood cask or keg, with wooden hoops, in most cases holding 112 lbs. I do not think it should be adopted by us. The class of customers we serve like the 56 lb. package better.

Mr. WENGER: I understand that in Wales they prefer the firkins at some seasons.

Mr. GRAHAM: Since I came to this Convention I have had two cables for butter, and they offer two shillings more for the boxes than the tubs?

Prof. ROBERTSON: Occasionally the wood inside the box has developed a slight mould which goes through the paper. If the wood is thoroughly kiln-dried it will prevent this and ensure little risk from the growth of mould.

A MEMBER: What thickness of lumber do you use?

Prof. ROBERTSON: Three-quarters of an inch; sometimes as thin as five-eighths if well dove-tailed.

Mr. CROIL: Some one at the Brockville convention stated that the boxes used in Australia and those made in Denmark were quite different and better than ours, and recommended Canadians to make the same style of boxes as were made in Australia. I would like to know what Prof Robertson thinks about that?

Prof. ROBERTSON: I was unable to agree with the premises and therefore could not agree with the conclusions.

Mr. CROIL: We get butter with a good deal of body and some light, soft butter. Do you think one will keep better than the other?

Prof. ROBERTSON: I think the heavy-bodied butter will keep better than the soft, and that the Australian will keep better than the Danish?

Mr. CROIL: Do you recommend cooling the cream down to a low point when it comes from the separator?

Prof. ROBERTSON: I do, indeed. It is a very safe and desirable practice.

Mr. CROIL: Prof. Dean gave us to understand that the temperature might be increased to 70 degrees, and that he had not found any difference.

Prof. ROBERTSON: I have found that after running milk through the separator at a temperature above 70° if the cream is not cooled you will get an oily butter, but if it is cooled to 40° or 45° you get a more solid body. To pasteurize the cream, it has to be raised to a temperature of 158 degrees. Many years ago the question came up as to whether the odor of turnips could be taken out of the cream and left out of the butter. The old prescription was to use a small quantity of saltpetre. The flavor of turnips in milk exists in the form of a volatile oil, and a few years ago I tried the experiment of driving this off. I fed some cows each seventy lbs. of turnips a day. I heated the milk to 155° and stirred it well. There was no odor or flavor of turnips on this butter. There was a most decided odor and flavor in the milk. At the same time we did not get quite so much butter by heating the milk as when this was not done. Again we took the cream off and heated it to 155°, stirred thoroughly, cooled it, ripened it and made butter. The butter had no odor or flavor of turnips and had a better body. By pasteurizing the cream we got more butter, a better butter, and no turnip odor. It usually pays to pasteurize the cream while it is sweet. It does not pay so well to pasteurize the milk.

Mr. CROIL: How low do you cool?

Prof. ROBERTSON: It is better to cool to 40, and then raise to 70 degrees. During last year a Dane made a machine for heating the milk and cooling it by rather an easy method.

A MEMBER: Prof. Dean claimed that the milk would skim closer if heated to 130° than to 90°.

Prof. ROBERTSON: In pasteurizing you must heat to about 158°. In our case we heated to 155°, and did not get so much butter out of the milk. In the making of butter the whole practice is an effort to get the butter-fat out from the skimmed milk and butter milk and have it as nice in taste and smell as it can be. Now, every attempt to do that must involve just one thing. If the milk is perfectly clean when you begin, and you keep it perfectly clean all through, you will have as nice flavored butter as you can have. If you have milk kept by a nice, tidy, clean dairy woman, you could not have anything better than that, but if you get the milk from fifty farms, some of which are not very clean, you must have some method of counteracting the effects of uncleanliness. That is where the scalding or pasteurizing comes in. What I want to get at is that the method is quite unimportant, except in regard to cheapness, if it will keep the milk and cream and butter perfectly clean.

The PRESIDENT: Don't you believe the cow knows more about the temperature of milk than any one else in the world? There is no doubt about it. The quicker you can separate the milk and butter the better. The temperature at which she gives it to you is the temperature it wants to be run through the separator as to make perfect butter.

## REGARDING AMALGAMATION.

Mr. AARON WENGER, Ayton, led in the discussion of the question of amalgamation as follows:

The remarks of Prof. ROBERTSON have covered exactly the points which I was to speak upon, and he has done it much better than I could. I have, however, another question to bring before the Convention. For the past ten or twelve years we have had three dairy associations. For some reason or other it is understood now that the Creameries' Association is dying or is dead. Now, I want you to understand that it is not a corpse. If it is it is a very live and spirited one. The creamery men met at the hotel the night before last and passed a resolution which I now read to you:

Moved by Mr. J. H. CROIL, seconded by Mr. A. A. WRIGHT, "That we, the representatives of the Ontario Creameries' Association, now in committee assembled, do hereby express our disapproval of the action of the Joint Committees at Toronto in amalgamating the three dairy associations into two butter and cheese associations, and do hereby protest against the same, and strongly advise the election of a Board of Directors for the Association for 1897. We, at the same time, believe that if amalgamation is desirable it would be advisable to form one Association only, and put the dairy business into the hands of a Dairy Commissioner, who will be directly under the control of the Minister of Agriculture."

Now, it seems to me, from the remarks of Prof. Robertson for the last half hour, that the butter business must be considered a most important part of the business of this country. We see that the cheese trade is in such a position that one cannot increase it very much. Now we do not propose to be "sat on" in that way. It is possible we may not get a grant, but I think we will elect our officers and keep ourselves in existence.

Mr. R. J. GRAHAM, Belleville: As one of the delegates who attended the Toronto meeting at which the funeral of this Association was discussed, and at which a resolution was passed with the view to doing away with the Creameries' Association and the forming of Butter and Cheese Associations for Eastern and Western Ontario, along with our worthy President, Mr. Derbyshire, and Mr. Wenger and Mr. Halliday, of Chesley, I may say that we discussed the matter both in caucus and in committee, and we were all of the opinion that the Creameries' Association as a body had done good work. We believe that our record will show that we have used the Government grants wisely; that we have not squandered the country's money; that we have been developing the butter

industry of this country, and that we are doing just as much in the interest of the country as we were at the inception of the Association. We felt, and I might say I personally feel to-day, quite strongly on the question of this Association's existence. I believe that if this Association is absorbed by the Eastern and Western Dairy Associations we loose our individuality, we lose to a certain extent prestige, and I think that when the butter industry of this country is coming rapidly to the front, as it has been doing during the past three or four years under the careful management of the Creameries' Association, we should not quietly drop out of existence, and that if there ever was any use for the Association there is more use for it now than before. We discussed this matter fully there, but the Minister of Agriculture seemed to think otherwise than ourselves, and, while we protested at the meeting, that resolution was carried over our heads. I do think now that in the interest of the butter business in this country, this Creameries' Association should appoint a new set of officers and keep themselves in existence, and if the Government in their wisdom see fit to withhold a grant I think possibly the creamery men of this Province can run the business with private money. We can do without the money of the Government if it does not want to give it to us The money is not theirs any way—it is our money; it belongs to the people. At the meeting in the hotel the other evening we discussed this matter and proposed officers, and I have a list of those proposed:

President, A. Wenger, Ayton; First Vice-President, J. Croil, Montreal; Second Vice-President, T. J. Miller, Spencerville; Directors, W. D. McCrimmon, Glenroy; A. Campbell, Ormond; C. R. Tousaw, Iroquois; Jno. Sprague, Ameliasburg; A. A. Wright, Renfrew; F. L. Green, Greenwood; James Carmichael, Arva; W. G. Walton, Hamilton; A. Q. Bobier, Exeter; Daniel N. Eckstein, Neustadt; James Struthers, Owen Sound; William Halliday, Chesley; William Snyder, St. Jacobs.

I move that these be the officers for 1897 for the Ontario Creameries' Association.

Mr. W. G. Walton, Hamilton, seconded the motion.

The President: At the meeting in Toronto, the position taken was that the three Associations should be formed into two. I know that the Creameries' representation was not favorable to that plan. The proposal is to drop the three old associations and form two, charged with the building up of the butter and cheese interests, with a man to give instructions in the east and another in the west, and a central advisory board from the two, to meet at Toronto. Of course I was not at this meeting of directors in the hotel. You understand that I was elected to the position of President of the new butter and cheese Association in the East, and I am going to do all in my power to make that organization the most useful one in the country. I am not only going to see that the cheese business is built up, but that the butter business is put on a better basis than ever before. Now, the western people say that they are willing to take hold of this butter and cheese business. What I should have liked to do was to enter into the arrangement suggested and try it for one year, and if possible make it a success. At the same time, I am not going to oppose this motion.

The motion, having been put by the President, was then declared by him to have been carried unanimously. Continuing he said: I wish you all prosperity. Of all the associations I have ever belonged to I have had the most pleasure from any connection with the Creameries' Association. The work has prospered in our hands. Everything we have done has seemed to be just the right thing for the bettering of the condition of the butter man; and I must say my relations with the members of the Association have given me the greatest pleasure. I assure you I am ready to do anything I can to further the interest of the butter and cheese men of this country.

## DAIRYING IN PRINCE EDWARD ISLAND.

By Mr. T. J. Dillon, Dominion Experimental Station, Charlottetown, P. E. I.

I am pleased to meet the Creameries' Association again, particularly in this part of the great dairy section of the Province. I was here in connection with the organization of the Avonbank Creamery Company five years ago, and have always had a desire to meet the men who made such a success of that enterprise.

I wish to congratulate you on the success of this Convention. The creamery interests are considered by many to be of less importance than are those of the cheese business, but to my mind they are of a great deal more importance. I think the creamery men should stick together and work shoulder to shoulder determinedly, and in a few years they will most assuredly build up an industry that will equal in magnitude our great cheese industry, and one that will be of even greater service to the country. If Canada is ever to become a butter exporting country, the butter will have to be made in creameries. It has been stated in this Convention that seventy-five million pounds of dairy butter were made in Canada last year. How much money is lost to the country by this butter being made in the farm dairies?

The President: There are three millions of dollars lost to the people in this way.

Mr. Dillon: Hundreds of tubs of dairy-made butter can be bought in nearly every city of central and eastern Canada at from seven to eleven cents per lb., and I have been selling creamery butter in a wholesale way nearly every day for the last two months at twenty cents per pound. The whole butter output of the country should and could be sold in this way if properly handled, but it must be made in creameries and the sooner the farmers realize this fact the better it will be for themselves.

Then we must aim to get a uniform quality, because the low price paid for dairy butter is in a great measure owing to the lack of uniformity. We should learn from this that too many creameries are not desirable, but that butter should be made in as few places as possible. There are twelve hundred cheese factories and creameries in this Province, everyone of which should be fitted up as a separating station, but all the butter of Ontario should be manufactured in not more than a dozen places.

Nearly all the separators on the market stand too high to be used to the best advantage in separating stations. If they were made sufficiently low to have the milk run to them from a small feeding vat, holding, say, 400 or 500 lbs, placed across the cheese vat in which the milk is received and partially heated, it would be a great help; or, better still, if they could be constructed so low as to allow the milk to run direct from the receiving vat to the separator. We have been using steam ejectors, that are sold with all separators, for elevating the milk in our separating stations up to the last of December, but were impressed with the idea that the direct steam on the milk had a bad effect on the flavor and churnability of the cream. We have been dipping the milk since the first of January, and the results are such that we will continue to do so, though it entails a great deal of labour.

A Member: How much butter are you making in Charlottetown?

Mr. Dillon: About 1,000 lbs. per day or 6,000 pounds a week at the present time.

A Member: Do you pasteurize the cream?

Mr. Dillon: No; none of our separating stations nor the Central Creamery are fitted with pasteurizing or cream cooling apparatus. We have had to do with as little outfit as possible. Money to pay for what we have has been hard to get, but we hope to have all the useful modern appliances in the near future. However, while I think pasteurization a good thing when necessary, I would advise farmers and dairymen to get the milk and cream in first-class condition. Then you will get a better quality and a better flavored butter if the temperature is never raised above what it was when taken from the

cow, and also save cost and trouble of pasteurizing. Some farmers are very persistent and will feed turnips. When you do so, cut the top end off and give it to the young or dry stock and the other part to the milch cows. One of our very best customers in St. Johns, Newfoundland, who used to take from 1,000 to 3,000 pounds of butter every two or three weeks, bought 3,000 pounds at twenty-two cents per pound a year ago last autumn. The butter was made in turnip-digging time, and, from some cause or other, had a turnipy flavor. We have not been able to sell that man a single pound since, though he was the sort of customer we would like to have held, as he always accepted our weights and paid the drafts when presented, but those are the customers that are in the best position to buy where they will not get turnipy butter.

There are several new styles of churns on the market, and it might be well for those who are putting in creamery plants to be cautious about the kind they purchase. I like the trunk-covered churns best. They open in such a way that it is an easy matter to get the cream in and the butter out of them, but their main point of excellence is the ease with which they can be kept sweet and clean by getting plenty of fresh air into them. The other styles nearly always have a musty smell, no matter how well they are washed and cared for.

We use the Mason power butter worker. It, or any kind of worker, where one can have the butter on the table before him and see just what he is doing, is best. We have been putting nearly all our butter up in prints and find it pretty slow, hard work. We frequently come out in the evening with lame wrists and blistered hands from pressing it into the printer. I think a machine could easily be constructed to run by steam so that the butter might be shovelled from the worker into it and come out in prints the sizes and shape desired.

A MEMBER: What number would need to be in a section to justify the establishment of a winter creamery? Would it pay to draw milk ten or twelve miles?

MR. DILLON: It would pay better to have a separating station. Then you could return the separated, or skimmed, milk to the patrons in the best condition for feeding. It does not cost half as much to fit up a separating station as a creamery. The cream may be taken thick, cooled, put into tight cans and teamed or freighted long distances. If it is churned in cities or large centres of population the buttermilk can be sold for human food or drink at double the price it would be worth as pig feed, and thus pay the cost of transportation. This scheme should have the hearty support of the temperance people as it would be a practical way of advancing the cause.

A MEMBER: Do you not often find bad effects from drawing cream in warm weather?

MR. DILLON: We make cheese in warm weather and butter from the separating stations during the cold season only; so I have had no experience.

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## REPORT OF INSTRUCTOR SPRAGUE.

It affords me pleasure to present my report for the year just ended. We began instructing on the 19th March, and completed the season on December 17th, the time being devoted to giving instruction in butter-making, directing the placing of machinery in new creameries and attending public meetings. I visited one hundred and forty creameries in all. Twenty-seven of these were cream-gathering creameries, and 113 separator or milk-gathering. I tested about 1,000 samples of milk with lactometer and Babcock test in factories where the milk was not paid for by test. The system of paying for milk by the percentage of butter-fat has not made as rapid progress as I would like to have seen, for there is no doubt that before we reach the high standard for our creamery butter which we expect to reach, the patron, or producer of the raw material—the milk—will have to be stimulated and educated to take better care of it from the time it is drawn from the cow until it is delivered into the hands of the butter manufac-

turer; and paying for it according to the butter-fat goes a long way toward this being done. It keeps the patrons' financial interest up to the time the sample is taken for testing, and it is soon demonstrated to them that if proper care is not given the milk the results from a test are not as good as they might have been. This, I believe, is one reason why the system meets with so much opposition.

Many of the new creameries built within the last two years are of modern type, are provided with proper drainage, and can be kept in first-class order. There are a few, however, that are not so, and it, to my mind, would be doing the industry no injustice to have the various instructors, members or officers of some board of health, vested with power and authority to see that in some of the severest cases a reformation is made. Tampering with milk by the patron has been decreasing each year, and I am pleased to state the number of cases known in the creameries could be counted on the fingers of one's hand. This alone is very encouraging, for there is to my mind nothing more disagreeable for an instructor to deal with.

This perhaps may be the last report your humble servant will have the pleasure of presenting to this, the Ontario Creameries Association, and in so doing I wish to express the earnest desire that the industry may still be fostered and looked after by the new organizations with the sole aim of reaching the highest standard of merit possible. We have the water, the climate, the pasturage, the dairy schools, the modern appliances and the people. With all these, there seems to me to be nothing between us and success if we diligently apply all these and at the same time try to make every package of butter uniform and worth more than the price paid for it by the consumer, while on the other hand we strive to cheapen the cost of producing this package of butter by judicious feeding, etc. During the nine years in which I have been engaged by the Association I have had many a long, tiresome day, but my desire has been never to measure the days or the amount I did by what I was paid, but rather to see how much I could do; and the many friendly associations and kindly greetings of the various directors and officers are to me pleasant remembrances which can never be forgotten. These, along with the very useful and valuable token of esteem presented to me at Cornwall on 15th January, 1896, are, to me, kindnesses which can never die.

MARCUS SPRAGUE.

## DUTIES ON CREAMERY MACHINERY.

Mr. R. J. GRAHAM then read a letter from the Hon. Sidney Fisher, Minister of Agriculture, Ottawa, inviting the Association to lay their views before the Tariff Commission with reference to duties respecting the creamery industry.

Hon. Mr. FIELDING, being present, stated that he had subsequently sent another communication to Mr. Graham at Belleville, stating that the Tariff Commissioners were obliged to go east, and suggesting that the Association should adopt a proposal just made by the President to appoint a committee to discuss the matter, submitting their views to the Convention before separation, and he would lay these before the Finance Minister and the Government.

At a subsequent meeting of the new directors it was decided to ask the Government to make no change in the tariff on butter-making machinery.

## INJURIOUS INSECTS.

By Dr. James Fletcher, Dominion Entomologist, Ottawa.

One of the most interesting and valuable addresses of the Convention was that on the above subject of Dr. James Fletcher, Dominion Entomologist and Botanist, Ottawa. It was important to the farmers, he said, that they should have a knowledge of the habits, etc., of the various insects. The army worm, for instance, feeds upon plants of the grass family. Knowing this, farmers need not, as many of them had done this season, plow up the adjoining clover field when an oat field was attacked. There is, he claimed, a loss of $10 out of every hundred to the farmers of the country from injurious insects. All insects can be divided into two classes, viz , the mandibulate, that bite their food, and those, like the horn fly, that suck their food. For the former all that is necessary is to put on the plant to be protected some poison that may be eaten with the foliage, and as a consequence the insect is destroyed—as Paris green for potato bugs. For the latter class some application must be made which will kill the marauding insects by merely coming in contact with their bodies, or which is of an obnoxious nature, which will keep away the insects. Of this class is the application of greasy substances to cattle to prevent injury by the horn fly. Remedies are either active or preventive. The Paris green is active; greasing cattle is preventive. It is now proved that any greasy substance rubbed on the cow will keep away the horn fly, and if mixed with something of offensive smell, like carbolic acid, will be all the better. The best known cure is kerosene emulsion, or coal oil and soap suds. Apply carefully and systematically for say ten days. It will cause no injury to the cow. A farmer says this is very great labor, but so it is with sickness or any exceptional circumstances. The same mixture will get rid of lice on cattle, or lard and sulphur will kill these disgusting insects. For potatoes, Paris green is the best remedy. It is insoluble and cannot by any means, as is sometimes erroneously supposed, get into the potato tuber; so, with ordinary care, there cannot be the slightest danger in using it. It is a cheap and exceedingly effective poison when eaten by insects. Its color is a warning of its dangerous character. In fact it is an ideal substance for destroying leaf-eating insects. For the codling moth on apple trees, a good spraying pump could be got for $10 or $12, and the cost of spraying, so as to save a large proportion of the crop, need not be more than 10 cents a tree. The Buffalo moth, so called, is an insect which in some towns is giving immense trouble. It is not a moth but a beetle. It eats all woolen goods, as carpets, curtains and furs, feathers, etc., and is said to have a great liking for the color red. Hence a common practice in Hamilton is to put red flannel in drawers where material liable to injury is kept. The carpets should be put down in squares or mats, or at least not tacked around the edges, so that they can be lifted frequently and shaken thoroughly. Infected goods may be put in a tight box, and treated with benzine, or the carpets might be washed over with benzine while on the floor, although this is a very dangerous business, as even the fumes would take fire if a lamp were brought into the room. Gasoline might be used instead of benzine, as it is cheaper. The room should be shut up for a couple of days, then the windows opened and the fumes let out before any light is brought in. Some other insects were treated of briefly, and Dr. Fletcher invited those present to ask questions concerning any others of interest to them which he had not mentioned.

A Member: Does the potato bug attack the sweet potato?

Mr. Fletcher: No. The sweet potato belongs to a different family of plants; it is really a convolvulus, while the potato is a night shade, and the insects which feed upon one of these are not in the least likely to attack the other, because, as in this case, some insects are very much restricted in the range of their food plants. The potato bug will, however, attack some plants related to the potato, as tomatoes or the egg plant. It is the most difficult insect we have to deal with on our egg plants at Ottawa, the beetles showing a decided preference for them over even potatoes; but the Colorado potato

beetle only feeds on members of the night shade family. The beetle which attacks sweet potatoes commonly, is one of the tortoise beetles and is quite different from the too well known Colorado potato beetle, which is yellow and has ten black stripes on its back. The insect that attacks the sweet potato is of a duller yellow, flatter in shape, and instead of stripes has has distinct black spots on its wing covers. This is of about the same size as the potato beetle. Besides this species there are two others of somewhat the same shape but half the size and with golden marks on the back.

A MEMBER: What do you consider to be the best remedy for the caterpillar which attacks the gooseberry and red currant?

Mr. FLETCHER: White hellebore. There are two broods of the caterpillars, and, if every one could be trusted to use it as recommended, I would say use Paris green for the first one and hellebore for the second. The second brood comes too late to be treated safely with Paris green, because the fruit is full grown and it is too near to the time of ripening, when the fruit is used. However, hellebore is all that is wanted, and it is sufficiently cheap to make it a practical remedy. If you mix an ounce in a pail of water it will destroy all the caterpillars on currants.

A MEMBER: I have not used anything but land plaster. You have to use it perhaps two or three times. I found that destroyed the worms.

Mr. FLETCHER: I have tried that too, but it was not quite so satisfactory as a poison. Paris green is a mineral poison and is much more dangerous than hellebore, being almost insoluble. The latter is a vegetable poison, and when it is wetted the poisonous principle is all brought out at once. This material also has a specially fatal effect upon these currant worms and those of other sawflies.

A MEMBER: Would it be safe to use hellebore on cabbage?

Mr. FLETCHER: The proper poison for cabbage worms is insect powder, which is perfectly safe, and not only almost as cheap but more effective than hellebore. It is not safe to use Paris green for cabbage worms, because some of the poison is sure to be washed down among the leaves, and certainly a great many cases of poisoning have been caused by that. By mixing insect powder with four times its quantity of common flour you will get an effective remedy. You ought to pay about sixty cents per lb. to get it good, and the five lbs. of mixture will last for a long time. Dust the powder over your cabbages and a very small quantity of it will soon destroy all the caterpillars. It has a peculiar effect upon caterpillars, paralyzing the muscles, which close their spiracles or breathing pores. It can be used at any time of the day and kills either as a dry powder or as a solution made by the rain or when the plants are moistened by dew, when the infusion will run down to parts of the plant not reached by the dry powder. A man or boy can soon cover a very large area of cabbage. Many of my correspondents have used this remedy with great satisfaction. In my report for 1894 is a letter from Mr. George Thomas, who used it on his farm and who writes that but for it he would have been a loser of 7,000 head of cabbages that year. The best remedy for the turnip flea-beetle, which also attacks young cabbages, is to dust with a mixture of Paris green, one lb., and land plaster fifty lbs. If you have a large farm you must have some easy and economical way of putting on these mixtures. If you are putting land plaster and Paris green on potatoes, for instance, a good plan is to make a small bag of open cheese cloth that will hold about a pound, tie it to the end of a short thick stick with a piece of string so that you can drop it to any length you like, and all you have to do is to walk along the rows and tap the bag as you walk with another light rod and it will give you no trouble at all but you will save your potatoes. All you need is to leave a little film of the poisoned powder on the plants, which will be eaten by the insect at the same time as the leaves.

A MEMBER: Did you ever find a remedy for the pea bug?

Mr. FLETCHER: Yes; it is not a very difficult insect to fight when the beetles remain in the peas over the winter. The simplest remedy, if you do not want to go to the expense of fumigating with bisulphide of carbon—a rather dangerous material to use—is

to tie your seed peas up in tight paper or cotton bags and hold them over for two years. The weevils will emerge the first spring and will die inside the bags. It will pay you over and over again before seeding to separate the injured peas from the whole ones, for you will never get a strong crop from peas which have been injured by weevils. The crop is usually much less although some of the seeds will germinate and produce a weak plant; but a very large percentage of the peas do not germinate at all.

A MEMBER: Will Paris green answer the same on this grub as on the caterpillar?

Mr. FLETCHER: No. There is no means by which you could apply it so as to reach them.

A MEMBER: What is the best remedy for the green fly on house plants. I would also like to ask whether any attention has ever been given at Ottawa to the beetle or borer which has been attacking the maple trees. Many of the trees in Windsor have had large pieces cut out of their trunks so that a strong wind would easily blow them down. As this is the country of the maple, it would be a very serious thing, indeed, if we were to lose our maples.

MR. FLETCHER: As to green flies on house plants, lemon oil, insect powder, or tobacco smoke, will destroy them, but the thing to remember is that one of these little insects can give birth to a great many young, and you must watch and kill every one. With regard to the borer in the maple trees in Windsor, I am glad to say this pest is not very widespread. Preventive remedies are the best for borers. The first thing to do is to find out what kind they are. In this case the culprit is the white grub of a beetle so far as I can find out. The beetle lays an egg in the bark. This egg hatches, and for the first year the grub eats the soft wood of the tree just beneath the bark. There is no trouble in treating the apple-tree borer. If a strongly alkaline solution of soda and soft soap is painted over the bark of the trees the female beetle will not lay eggs on them, but if the trees have already been almost destroyed the most advisable plan would be to plant young trees between and cut the old ones down and get rid of them. If I remember right, the trees in Windsor are the silver maple, and I would decidedly advise not planting that species again, because they have many defects that are not characteristic of other trees.

A MEMBER: What about plum trees and cherry trees attacked with black-knot? I have cut the trees down and burned them up.

Mr. FLETCHER: Well, at any rate that is a sure remedy. We have not yet got any wash to spray over the trees to prevent the black-knot, but I think the method of spraying trees with Bourdeaux mixture to prevent fungous diseases will prove to be a good one to prevent the spread of black knot also. The spores are distributed early in the spring, and if you merely cut off the affected limbs and throw them under the trees, as is frequently done, the spores will mature and be blown about to infest other trees as surely as if they had been left on the tree.

Mr. D. C. BROWN: I find there is no good in cutting the black-knot off the trees.

Mr. FLETCHER: I think you are mistaken. At the Experimental Farm we happen to be in one of the few favored districts where the black-knot is almost unknown. I could go for miles on the Ontario side of the Ottawa River and not find a single specimen of the disease. We sometimes find the black-knot in imported trees planted in the orchard, but we always cut them off carefully, and so far we have prevented all loss from this parasite.

Mr. BROWN: I had an old tree which was affected.

Mr. FLETCHER: But is not the whole district infested? While you have cut the black-knot off one tree there may be many others developing and casting out their spores to give you trouble.

MR. LEGGE: I had an old plum tree so badly affected with black-knot that I cut it off and whitewashed the tree. Sometime afterwards when I passed I was surprised to see that the tree was growing where the black-knot had been.

Mr. Brown said his trees, which had been pretty well supplied with house ashes, were all right.

Mr. Fletcher: Potash is frequently a very much wanted constituent in the soil of many orchards; so much so that in New York State it was thought at one time to be a sovereign remedy for the yellows in peaches. Its use may have made the trees less susceptible to injury than before. Still I do not think it would prevent the disease, although it may have carried them safely past the condition in which they were liable to infection.

A Member: In regard to spraying, I have heard some of our wiseacres say that because we had a heavy crop of fruit this year we are going to have none next season. I would like to hear from Mr. Fletcher about that.

Mr. Fletcher In answer to that, of course it is impossible to say, but the indications are that we shall not have a very large crop, because the trees were so tremendously loaded this year, and they can only lay up a certain amount of energy to do the work; but mind you the crop next season is going to be very much more valuable, if it is a small one, and it is going to pay far better to spray this year than it did last season.

Mr. Legge: The fruit crop last season was such a universally good one that we could not say the trees which were sprayed bore much better than those which were not, but there was a better growth of wood in the trees which were sprayed, and in my own case I had no difficulty in picking out the trees which were sprayed, from their clean appearance. Some of the trees were sprayed six times, and while they were clean those beside them had the usual amount of moss.

A Member: You said that seed peas which had no bugs would grow no bugs. I have lots of peas and I have not a bug. I have sown peas for thirty years or more. If you sow before 1st May you are going to have bugs; if you sow from the 12th to the 15th or 25th you will not find any bugs. This year I sowed about the 18th and from that on gradually, because the early season was dry. I would advise any one to sow peas about the middle or 20th of May.

Mr. Fletcher: There is nothing much to say further about this. This gentleman tells us that by sowing peas after the time that the bugs were about he produced a crop with no bugs. That is a very good method. If you sow clean peas you will not get bugs. Certainly not. Some people think that it does not matter however clean you sow peas they will produce bugs; but if every man of you would sow clean peas you would soon get rid of them. It is the only method of fighting the insect; but you cannot get farmers to adopt late sowing as a general method. There is hardly a gardener or farmer in the country but will boast that he got his peas in before the frost was out of the ground. Changing the time of sowing a crop is frequently a useful method to adopt for injurious insects. We have not heard of the Hessian fly for some time, but now it is increasing again, so you will have to sow your wheat later, perhaps even after the third week in September. You would not like to do that, but you will have to if this insect increases. Late sowing may be a remedy in the case of the pea-weevil also. Perhaps if you go down to the county of Prince Edward, where such good peas are grown, and other parts of the Province, you may have to sow at a slightly different time than here. I am much obliged to the gentleman for mentioning the matter, and I have noted it so that we may repeat some experiment in this direction to find out the value of the plan.

Mr. Legge: I want to tell you about this pea bug. These last two seasons have been favorable for peas. Late grown peas will get mildewed in a wet season.

A Member: I would not take too much stock in this remedy. I tried it myself, and here is a friend beside me who tried it also. He had no bugs, but he had no peas. (Laughter.)

Another Member: For two or three years this experiment has been tried in this section and was favorable, because the weather was dry. This year the weather was moist and the peas mildewed, and we had not so much as we sowed on the field.

Another Voice: Likely this man's land was rich, and perhaps he sowed the wrong variety.

The Preceding Speaker: There were three neighbors sowed three different kinds of peas and the results were all the same.

Mr. Brown: My experience has been that most of the seasons are dry, and it is profitable to sow late, supposing we do have a wet season once in a while. We can afford to lose one crop now, if we can get a heavier crop for several seasons. If we can weed this pest out it will richly pay this section of country to sow late for a couple of years; but if we sow too late we get no crop, whether the season is wet or dry.

A Member: The only way I have is to sow early, and, if there are bugs have about twenty or thirty hogs ready and feed the peas to them.

Mr. Fletcher: With regard to late sowing, I have learned something that it was worth coming from Ottawa to hear. In Prince Edward county a great many years ago the farmers tried late sowing, but have since discarded it. Every different locality varies a little in conditions. We have in Canada a great many districts where by careful comparison of results for several years we can arrive at useful conclusions from the experience of many. At the same time we are able to generalize, and when we find that here general principles apply, they are worth remembering. However, it does not do to be too much carried away with any one statement. However careful you may be, you will sometimes be mistaken. Late sowing has been practised very largely with regard to this pea-bug trouble in Prince Edward, where I have made most inquiry, and has been by many given up. It is something to be proud of that the best seed peas advertised by Carter's, and other great firms in England, are grown in Canada, many of them in Prince Edward county. There is another insect I should like to refer to, which attacks peas—a small caterpillar which injures the peas in the pod by gnawing into them. We have not been able to find any remedy yet for this.

The President, in closing the discussion, and at the same time the Convention, urged all who had attended to use their influence to improve their breed of cows, their methods of feeding, and their methods of handling the milk, so as to enable the creamery to produce the finest butter, which would bring the best price in Britain.

Votes of thanks to the speakers, to the citizens of St. Marys for their hospitality, to the press for its reports, and to the railways for reduced fares, closed the proceedings.

# APPENDIX.

## LIST OF MEMBERS FOR 1897.

### BUTTER AND CHEESE ASSOCIATION OF EASTERN ONTARIO.

| Name. | P. O. Address. | Name. | P. O. Address. |
|---|---|---|---|
| Arnold, J. B | Easton's Corners. | Johnston, Jonathan | Jasper. |
| Ayer, A. A | Montreal, Que. | Jones, J. W | Frankville. |
| Bensley, G. H | Warkworth. | Jelly, Robert | Jellyby. |
| Bird, Morden | Stirling. | Judson, M. B | Lyn. |
| Bissell, James | Brockville. | Kidd, Edward | North Gower. |
| Babcock, D. F | Chippewa Bay, N.Y. | Keath, David | Battersea. |
| Bissell, Howard | Brockville. | Kerr, Geo | Elgin. |
| Brenton, F W | Belleville. | Kinsella, John | Lancaster. |
| Berney, Thos | Athens. | Knapp, Joseph | Plum Hollow. |
| Buro, Jehial | Mille Roche. | Kaiser, W. R | Lansdowne. |
| Bellamy, Geo. C | Toledo. | Leggett, B. A | Singleton. |
| Burney, Matthew | Winchester. | Lalonde, Emery | Wendover. |
| Carlaw, T. B | Warkworth. | Murphy, R. G | Elgin. |
| Cook, John J | Shannonville. | Marshall, N. J | Athens. |
| Coade, Byron | Burritt's Rapids. | Munroe, Murdoch | Apple Hill. |
| Cranson, A | Elginburg. | Mallory, E. J | Mallorytown. |
| Croil, Jno. H | Montreal, Que. | Miller, Thomas | Spencerville. |
| Cossitt, Newton, Sr | Brockville. | Morrison, W. J | Merrickville. |
| Cossitt, Newton, Jr | Brockville | Marshall, V. R | Brockville. |
| Cavanagh, Robert | Carleton Place. | Miller, James | Cardinal. |
| Cochrane, James | Winchester. | Madden, E. J | Newburgh. |
| Carl, L. W | 113 Portland St., Portland, Maine. | Morton & Manhard | Fairfield East. |
| | | Mott, W. J | Big Springs. |
| Campbell, A | Ormond. | Monrad, J. H | Winnetka, Illinois. |
| Castel, Emile | St. Hyacinthe, Que. | McDonald, M. (M.P.P.) | Acton Vale, Que. |
| Derbyshire, D | Brockville. | McLeod, Neil | Moose Creek. |
| Daly, P. R | Foxboro'. | McTavish, John | Vancamp. |
| Donovan, A. E | Athens. | McCann, Samuel T | Newboro'. |
| Dickey, J. J | Brockville. | McVeigh, Lester | Brockville. |
| Dargavel, J. R | Elgin. | McDougall, A. D | Brockville. |
| Davidson, David | Lyn. | McGregor, James C | Balderson. |
| Davison, D. H | Delta. | McIntosh, Orlando | Winchester Springs. |
| Davis, E | Addison. | McCargar, J K | Belleville. |
| Everetts, M. K | Easton's Corners. | McIntyre, Thos | Dixon's Corners. |
| Elliott, R | Carp. | McNish, W. H | Lyn. |
| Earl, Rufus | Algonquin. | O'Grothe & Co., L | Montreal, Que. |
| Edwards, John | Algonquin. | Olmstead & Co | London. |
| Eager, William | Morrisburg. | Oakley, Daniel | Norwood. |
| Furgeson, F | Delta | Owens, C L | Campbellford. |
| Frink, George | Odessa. | Pearson, W. W | Kemptville. |
| Gilroy, G. A | Glen Buel. | Proud, W. W | Singleton. |
| Gowing, D. H | Syracuse, N.Y. | Patten, Levi | Oxford Mills. |
| Green, Johnson & Sons | Athens. | Peters, S P | Thorpe. |
| Grant, W. W | Peterboro'. | Purvis, A. P | Maxville. |
| Gibson, O. L | Caintown. | Porter, Geo | Elginburgh. |
| Godkin, Geo. E | Escott. | Raphael, J. C | Mallorytown. |
| Gibson, J. M | Douglass. | Redmond, J. K | Lansdowne. |
| Halladay, E. V | Elgin. | Roode, E. A | Hubert. |
| Hollingsworth, S | Athens. | Rabb, A. B | Frankville. |
| Henderson, John | Winchester Springs. | Strong, P. W | Brockville. |
| Howey, H | Newburgh. | Singleton, John H | Newboro'. |
| Halladay, Edward | Elgin | Smith, C H | Chantry. |
| Holmes, W. M | Shanley. | Shaver, A. S | Winchester Springs. |
| Harris, D. A | Wicklow. | Sheldon, Frank | Oak Leaf. |
| Harris, W. G | Wicklow. | Stewart, J. W | Lyn. |

LIST OF MEMBERS.—*Continued.*

| Name. | P. O. Address. | Name. | P. O. Address. |
|---|---|---|---|
| Soper, H. L | South Mountain. | Weir, J. K | Easton's Corners. |
| Stringer, A. W | North Augusta. | Wickwire, F. B | Easton's Corners. |
| Topping, W. N | Athens. | Weir, J. R | Winchester. |
| Utman, W. C | Moorewood. | Wilson, John B | Wilstead. |
| Utman, Jas. E | Winchester. | Wieland, A. C | Montreal, 36th St., Que. |
| Utman, Nelson A | Moorewood. | Whitton, W. A | Wellman's Corners. |
| Whitton, Jas | Wellman's Corners. | Walker, Anson | Algonquin. |
| Whitney, H. D | Toledo. | Wiltse, F. T | Lyndhurst. |

BUTTER AND CHEESE ASSOCIATION OF WESTERN ONTARIO.

| Name. | P. O. Address. | Name. | P. O. Address. |
|---|---|---|---|
| Atkinson, W. J | Medina. | Bair, A. F | Thamesford. |
| Alderson, Thos | Kintore. | Boyes, J. W | Mapleton. |
| Annick, Wm | Brantford. | Burlington, Ed | Watford. |
| Aldrich, Aaron | Newbridge. | Barton E | Nilestown. |
| Angus, W. D | Newry. | Brunk, David | Poole. |
| Adams, C. F | Trowbridge. | Bell, J. C | London, 388 Ridout St. |
| Augur, E | Brownsville. | Chowan, R | Thamesford. |
| Antice, Chas | Springford. | Clement, Geo. F | New Durham. |
| Anderson, Wm | Woodstock. | Clark, Jas | Vienna. |
| Allen, Edwin S | Ingersoll, Box 233. | Cooper, C. R | Toronto. |
| Brodie, John | Mapleton. | Coleridge, Wm | Yeovill. |
| Brown, W. W | Attercliffe Station. | Crosby, J. T | Guelph. |
| Boves, Geo. A | Evelyn. | Caswell, R. W | Simcoe. |
| Biffin, Jas | Bennington. | Cournis, Geo | New Hamburg. |
| Ballantyne, R. M | Stratford. | Cook, Geo. W | Ingersoll. |
| Bothwell, Wm. A | Hickson. | Clark, W. S | Stirton. |
| Beecraft, R. K | Nixon. | Calder, A. G | Clarksburg. |
| Blayney, John | Lynnville. | Craddock, C. G | Brantford. |
| Pond, Byron | York. | Collins, D | St. George. |
| Bull, George | Guelph. | Corliss, J. G | Burgessville. |
| Ballantyne, Hon. T | Stratford. | Copeland, J. W | Eastwood. |
| Brown, M. R | Appin. | Chandler, J. E | Eden. |
| Boothe, Geo. E | Ingersoll. | Coleman, E. C | Seaforth. |
| Boyes, Fred | Evelyn. | Carmichael, Jas | Arva. |
| Barry, T. D | Ingersoll. | Charlton, Thos. W | St. George. |
| Baskett, Miss Sarah | London. | Clarke, Alex | Stratford. |
| Bruce Bros | Gormley. | Cuthbertson, J | Willburn. |
| Brodie, Geo | Gladstone. | Cosh, Newton | Woodstock. |
| Brown, H. W | Beaconsfield. | Cuddy, Robt | Woodstock. |
| Barr, Geo. H | Sebringville. | Cooke, Jno. W | Ingersoll. |
| Bell, A. T | Tavistock. | Connelly, Jas | Porter Hill. |
| Bristow, Jas | Bright. | Clemons, C. W | St. George. |
| Boyle, John | Lynden. | Cohoe, E. F | Hurnberstone. |
| Bair, Robert | Ethel | Campbell, Jno. H | Grand View. |
| Byerlay, W. H | Courtland. | Coulter, Jas | Walkerton. |
| Brooks, F. H | Holbrook. | Connolly, B. J | Kintore. |
| Ballantyne, Thos., Jr | Stratford. | Connolly, Jas | Alsfeldt. |
| Boyes, Frank | Nilestown. | Culver, Edwin | Mapleton. |
| Bishop, W. R | Beachville. | Court, Wm C | Derwent |
| Blackmore, J. G | Drumbo. | Chalcraft, E | Christina. |
| Barton, A | Onondago. | Chalmers, Alex | Monkton. |
| Baird, R | Chesterfield. | Chalmers, D | Poole. |
| Beaton, John | Alberton. | Corrigan, Philip | Arkona. |
| Borland, Jno | Verschoyle. | Downham, Peter | Innerkip. |
| Brett, Wm | Ingersoll. | Dempsey, Jno | Stratford. |
| Bowman, C. W | Ingersoll. | DeLong, G. V | Cottam. |
| Ballantyne, Jno | Attwood. | Durst, F. W | Canboro. |
| Bitzner, Jos | Orkney. | Dillon, T. J | Charlottetown, P.E.I. |
| Boyle, W. R | Rockton. | Dunn, T. W | Embro. |

List of Members.—*Continued.*

| Name. | P. O. Address. |
|---|---|
| Dempsey, D. A | Stratford. |
| D bie, R. J | Egmondville. |
| Day, H. F | Thamesford. |
| Drummond, Hon. R. J | Dairy Institute, Kilmarnock, Scotland. |
| Ellis, Chas. W | London. |
| Eagle, Harold | Attercliffe Station. |
| Edgar, W. A | Culloden. |
| Eccles, J | Norwich. |
| Elliott, Jas | Tilsonburg |
| Everett, C. H | Sebringville. |
| Easton, Fred | Paris. |
| Edwards, A. W | Caistorville. |
| Evans, R. J | Nanticoke. |
| Evans, C. R | Nanticoke. |
| Ford, E. G | Lynn Valley. |
| Farrington, J. L | Norwich. |
| Fisher, J. J | Stratford. |
| Fearman, Jas | York. |
| Flack, Samuel | Lavender. |
| French, Geo. M | Defiance, Lafayette Co., Wis., U.S.A. |
| Facey, S. E | Harrietsville. |
| Green, R. H | Peterboro'. |
| Grieves, Jas | Wyandotte. |
| Greensides, Wm | Ethel. |
| Gray, Jas. A | Listowel. |
| Grieves, Thos | Wyandotte. |
| Goodhand. G. E | Milverton. |
| Gibson, Thos | Fordwich. |
| Gardham, J. A | Windham Centre. |
| Gray, W. W | Stratford. |
| Good, Thos. A | Brantford. |
| Gott, Lewis A | Strathroy. |
| Green, P. H | Sheffield. |
| Glover, J. R | Tilsonburg. |
| Gilmour, John | Nilestown. |
| Gillard, W | Stratford. |
| Gettlar, Albert | Fullarton. |
| Ginther, Ezra | Winger. |
| Gillison, R. T | Avonbank. |
| Gray, G. R | Lyndoch. |
| Hurlburt, W | Hawtry. |
| Hately, Geo | Brantford. |
| Hunter, J. J | Cainsville. |
| Henderson, E. G | Windsor. |
| Hill, Geo. W | Summerhill. |
| Humphrey, T. J | Birr. |
| Hood, Wm | St. George. |
| Harris, A. M | Lakeview. |
| Hartley, A | Harley. |
| Hunter, Ed | Woodstock. |
| Hill, J. F | Paris. |
| Harris, Emerson | Verschoyle. |
| Howell, A. J | Brantford (Bow Park). |
| Harcourt, Geo | Toronto, 1070 Bathurst St. |
| Holmes, Geo | Thamesford. |
| Harris, Henry | Nilestown. |
| Harrison, Herbert | Kincardine. |
| Holland, B. A | Walton. |
| Ireland, Ernest | Newcastle, N.S.W., Australia. |
| Isaac, Jno. R | London. |
| Impett, Thos | London West. |
| Isard, J. S | Paisley. |
| James, Jas. A | Nilestown. |
| Johnston, Robt | Bright. |
| Jackson, Miss Lizzie | Petrolea. |
| Johnston, E. D | Holmesville. |
| Jenkins, Chas | Thamesford. |
| Jackson, J | Nanticoke. |
| Knechtel, Moses | Tavistock. |
| Kennedy, A | Ayr. |
| Kauffman, C. W | Villa Nova. |
| Karn, Jas | Embro. |
| Kinney, Geo | Snellgrove. |
| Kelly, Levi | Alberton. |
| Kline, F. E | Lakefield. |
| Kennedy, Geo | Kingsmill. |
| Kennedy, Ernest | Welland. |
| Larcle, A | Elmira. |
| Lee, S. R | Otterville. |
| Luton, C. O | Lyons. |
| Leacle, Sam'l | Lucknow. |
| Lipsit, L. H | Straffordville. |
| Leitch, J. A | Lucknow. |
| Leitch, C. G | Sebringville. |
| Laird, Sam'l | Ingersoll. |
| Loughlin, W. C | Dorchester. |
| Leitch, Jas | Springford. |
| Laing, J. R. A | Avonbank. |
| Leak, F. A | Blytheswood. |
| Lotan, Jos | Appin. |
| Muir, Jno. B | Avonbank. |
| Maynard, David | Drumbo. |
| Millar, T. B | Kincardine. |
| Munn, D. C | Windham Centre |
| Millar, John F | Brantford, Box 115. |
| Murray, Robt. A | Brooksdale. |
| Mayhew, Jos | Renforth. |
| Martin, Jno | Waterford. |
| Miners, C. G | Tilsonburg. |
| Morrison, Jas | Henfryn. |
| Morrison, Albert | Fullarton. |
| Murray, John R | Avonton. |
| Medd, W. G | Melbourne. |
| Morrison, Murdoch | Harriston. |
| Millar, A | Walmer. |
| Moulton, Jas | Verschoyle. |
| Moyle, Fred | Paris. |
| Martin, John | Harrisburg. |
| Mitchell, J. W | Ottawa (Dairy Commissioner's Office). |
| Martin, Joab | Oshweken. |
| Mills, Geo | Thamesford. |
| Moore, D. F | Maple Leaf. |
| Morrison, Miss Mary | Newry. |
| Morrison, Miss Aggie | Newry. |
| Munro, R | Port Elgin. |
| McKenzie, Geo. M | Ingersoll. |
| McCulloy, W. J | Constance. |
| McLaughlin, N. S | Henfryn. |
| McLaren, A. F., M.P | Stratford. |
| McEwen, Jas | Sebringville. |
| McIlwrath, J. H | Bookton. |
| McMillan, D | Harrington. |
| McIntyre, Lorne | Crosswell, Mich. |
| McCombs, Jas | Cathcart. |
| McFarlane, Albert | Holmesville. |
| McCabe, J. A | Lynden. |
| McDonald, Geo | Bluevale. |
| McLillan, A | Onondaga. |
| McEwen, Robt | Brantford. |
| McEwen, F. S | Verschoyle. |
| McLaren, Jas. B | Ingersoll. |
| McKellar, D. A | White Oak. |
| McLeod, Geo. B | Oliver. |

LIST OF MEMBERS.—*Concluded.*

| Name. | P. O. Address. | Name. | P. O. Address. |
|---|---|---|---|
| McGregor, J. J | Mapleton. | Stacey, Thos | Fullarton. |
| McKellar, Jno. | Belmont, Box 10. | Stacey, John | Mitchell. |
| McFie, J. W | Appin. | Shearer, W. C | Bright. |
| McCimmon, S | London, 172 William St. | Smith, S. A | Dorchester. |
| McIntyre, D. A | Strathroy. | Sleightholm, F. J. | Strathroy. |
| McKenzie, A | Donegal. | Schweiber, Oscar | Chesterfield. |
| Norman, Frank | Musselburg. | Storr, A. J | Norwich. |
| Newcombe, N | Britton. | Simister, R. A | Ingersoll. |
| Nicholas, E | Burgessville. | Smith, A. C | Paris. |
| Nanckeville, Wm. J | Ingersoll. | Shepherd, John A | Vanessa. |
| Nimmo, Ernest | Ripley. | Schneider, Louis H | Crosshill. |
| Nimmo, Thos | Ripley. | Stacey, W. P | Fullarton. |
| Oliver, Walter T | Arva. | Stevenson, R. S | Ancaster. |
| O'Flynn, J. J | Kinkora. | Shantz, Emanuel | Wallace. |
| O'Flynn, T | Tavistock. | Stirton, R. D | Gladstone. |
| Parker, R. A | Woodstock. | Sinclair, D | Cotswold. |
| Platt, John | Wenn (Salop), Eng. | Scott, John H | Harrietsville. |
| Peters, Oliver | Brunner. | Smuck, C. G | Tupperville. |
| Prain, John | Harriston. | Teeple, Lewis | Dunboyne. |
| Pearce, J. S | London. | Tutt, H | Kelvin. |
| Papineau, P. C | Constance. | Taylor, J. T | Caistorville. |
| Patterson, Jas | New Durham. | Travis, Geo | Courtland. |
| Paget, J. N | Canboro. | Treffry, Chas. E | Hawtry. |
| Pettit, Stephen | Windham Centre. | Travis, F. E | Straffordville. |
| Pettypiece, Wm. M | Motherwell. | Thompson, F. A | Hickson. |
| Pate, Jas | Brantford. | Thompson, W. B | Brooksdale. |
| Pedden, W. A | Woodstock. | Thompson, R | Eastwood. |
| Pyke, Geo. B | Brantford. | Tillson, E. D | Tilsonburg. |
| Pow, John | Vittoria. | Thompson, J. L | Belfast. |
| Porritt, W. F | Nanticoke. | Thomas, J. H | Ingersoll. |
| Robertson, Robt | London. | Tuttle, R. S | Brantford. |
| Richardson, D | Watford. | Thompson, S. A | Nanticoke. |
| Rurling, C. A | Bloomsburg. | Vankleeck, Jeptha | Listowel. |
| Richardson & Webster | St. Marys. | Winder, Wm | Springfield. |
| Rollings, Walter | Walsh. | Waring, Ed | Newark. |
| Rounds, A. D | Harrington. | Wood, A. R | Avonton. |
| Ransford, John | Clinton. | White, Harry | Stratford. |
| Robbins, S | New Durham. | Westphall, A. A | Dundas. |
| Robeson, Jas | Stratford. | Wooley, Henry J | Simcoe. |
| Riesberry, Jno | Bright. | Wellford, John | Belton. |
| Rice, F. A | Sweaburg. | Wilson, Hugh E | Arkona. |
| Robeson, W | Campbell's Cross. | Wyles, W. J | Baden. |
| Riley, C. W | Ingersoll. | Wilson, Frank | Britton. |
| Richardson, J. W | Caledonia. | Wellman, Jas | Harley. |
| Rollins, Victor | Lucan. | Wilkinson, J. H | Verschoyle. |
| Ropp, N | Wellesley. | Wood, J. G | Kelvin. |
| Ross, Jas. F | Londesborough. | Wardle, John | Springford. |
| Suhring, Wm | Sebringville. | Wood, Geo. R | St. Marys. |
| Symington, J. W | Camlachie. | Wilson, C. C. L | Ingersoll |
| Smith, F. L | Tormore. | Walters, R. A | Cheapside. |
| Stratton, R. W | Guelph. | Walker, Geo. A | Dresden. |
| Shuttleworth, J. M | Brantford (Bow Park). | Wait, S. C | St. George. |
| Steinhoff, I. W | Stratford. | Waddell, Wm | Shakespeare. |
| Sinclair, Jas | South Middleton. | Westlake, J. H | St. Thomas. |
| Southwick, H. A | Avonton. | Watcher, Wm | Gladstone. |
| Smith, A. D | Brownsville. | Williams, J. H | Paris Station |
| Sovereign, Oscar | Windham Centre. | Ward, A. D | Nanticoke. |
| Schrumm, Alf | Bismarck. | Wedrick, M | Nanticoke. |
| Spencer, Herbert W | Straffordville. | Ward, D. J | Nanticoke. |
| Stone, G | Courtland. | Young, Jas | Thamesford. |
| Smith, Levi | Putnam. | Young, R | Thamesford. |
| Secord, Cyrus | Tisonburg. | Young, T. E | Strathroy. |

# BUTTER AND CHEESE ASSOCIATION OF WESTERN ONTARIO.

## OFFICERS FOR 1897.

| | |
|---|---|
| *Hon. President,* | Hon. Thos. Ballantyne, Stratford. |
| *President,* | A. F. MacLaren, M.P., Stratford. |
| *1st Vice-President,* | John. S. Pearce, London. |
| *2nd Vice-President,* | Harold Eagle, Attercliffe Station. |
| *3rd Vice-President,* | Aaron Wenger, Ayton. |
| *Secretary-Treasurer,* | George Hately, Brantford. |
| *Directors :* | |
| Division No. 7, | John Prain, Harriston. |
| Division No. 8, | J. N. Paget, Canboro'. |
| Division No. 9, | Andrew Pattullo, M.P.P., Woodstock. |
| Division No. 10, | James Connolly, Porter Hill. |
| Division No. 11, | R. M. Ballantyne, Stratford. |
| Division No. 12, | J. A. James, Nilestown. |
| Division No. 13, | James Carmichael, Arva. |
| *Instructors :* | |
| District No. 1, | T. B. Millar, Kincardine. |
| District No. 2, | James Morrison, Stratford. |
| District No. 3, | Alex. Clarke, Stratford. |
| *Auditors* | J. A. Nelles, London.<br>J. C. Heglar, Ingersoll. |
| *Representative to the Industrial Fair* | A. F. MacLaren, M.P., Stratford. |
| *Representatives to the Western Fair* | John S. Pearce, London.<br>R. Robertson, London. |
| *Representatives to the Provincial Fat Stock and Dairy Show* | Harold Eagle, Attercliffe Station.<br>R. M. Ballantyne, Stratford. |

# BUTTER AND CHEESE ASSOCIATION OF EASTERN ONTARIO

## OFFICERS FOR 1897.

| | |
|---|---|
| *President,* | D. Derbyshire, Brockville. |
| *1st Vice-President,* | John McTavish, Vancamp. |
| *2nd Vice-President,* | E. J. Madden, Newburg. |
| *3rd Vice-President,* | R. J. Graham, Belleville. |
| *Secretary,* | R. G. Murphy, Elgin. |
| *Treasurer,* | P. R. Daly, Foxboro'. |
| *Directors:* | |
| Division No. 1, | Edward Kidd, North Gower. |
| Division No. 2, | Wm. Eager, Morrisburg. |
| Division No. 3, | John R. Dargavel, Elgin. |
| Division No. 4, | Jas. Whitton, Wellman's Corners. |
| Division No. 5, | T. B. Carlaw, Workworth. |
| Division No. 6, | Henry Wade, Toronto. |
| *Instructors:* | |
| G. G. Publow, | Perth, Ont. |
| A. P. Purvis, | Maxville, Ont. |
| L. A. Zufelt, | Chesterville, Ont. |
| Mark Sprague, | Ameliasburgh, Ont. |
| H. Howey, | Newburgh, Ont. |
| Geo. Bensley, | Warkworth, Ont. |

# FINANCIAL STATEMENTS FOR 1896.

## DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

### Receipts.

| | |
|---|---|
| Cash balance from 1895 | $293 06 |
| Members' fees | 224 00 |
| Legislative grant | 2,750 00 |
| Proceeds from advertisements in Convention programme | 194 50 |
| One-half of fines received per T. B. Millar | 82 50 |
| Proceeds from note discounted January 21st | 492 30 |
| Factory fees for inspection received | 192 50 |
| Secretary's travelling expenses for 1896 received from factorymen and others | 41 30 |
| Inspectors' expenses received for conducting dairy tests at Fairs | 13 25 |
| Fees for services of syndicate instructor received from factories | 236 00 |
| Total | $4,519 41 |

### Disbursements.

| | | |
|---|---|---|
| Convention expenses: | | |
| Speakers' services and expenses | $173 45 | |
| Printing programmes and wrappers | 167 25 | |
| Printing badges and ribbon, circulars, dodgers, etc | 47 54 | |
| Advertising | 114 00 | |
| Reporting | 80 00 | |
| Sundries | 10 00 | |
| | | $592 24 |
| 1,000 copies special edition *Sentinel-Review* for distribution | | 50 00 |
| Balance inspector's travelling expenses for 1895 | | 66 00 |
| Directors' expenses | | 164 80 |
| Office expenses and auditing | | 193 12 |
| Printing programmes for cheese and butter-makers' meeting | | 5 00 |
| Printing prospectus, agreements, etc | | 25 00 |
| Secretary's travelling expenses for 1896 | | 171 61 |
| Inspectors' " " | | 361 56 |
| J. W. Wheaton, on salary account, 1896 | | 919 50 |
| T. B. Millar, salary in full for 1896 | | 800 00 |
| J. B. Muir, on salary account, 1896 | | 250 00 |
| Inspector's supplies | | 7 75 |
| Released note discounted January 21st | | 500 00 |
| H. White, services and expenses *re* organizing syndicates | | 21 65 |
| Lawyer's fee *re* Lamont appeal case, 1895 | | 19 33 |
| Expenses of local conventions | | 52 55 |
| Grant to Western Fair, Industrial Fair, Provincial Fat Stock and Dairy Show | | 200 00 |
| Balance in bank | | 119 30 |
| Total | | $4,519 41 |

### Assets.

| | |
|---|---|
| Balance in Bank | $119 30 |
| Factory fees unpaid | 40 00 |
| Amount due from syndicate factories | 13 00 |
| Amount due from advertisements in Convention programme, 1896 | 9 00 |
| Office fixtures, etc | 40 00 |
| Total | $221 30 |

### Liabilities.

| | |
|---|---|
| Balance due J. B. Muir on salary account, 1896 | $200 00 |
| Balance due secretary on salary account, 1896 | 80 50 |
| | $280 50 |

We hereby certify that we have examined the books and vouchers of the Dairymen's Association of Western Ontario for 1996, and find them correct and in accordance with the foregoing statement.

JNO. GRAY.
J. A. NELLES, } Auditors.

January 12th, 1897.

## EASTERN DAIRYMEN'S ASSOCIATION.

### Receipts.

| | |
|---|---|
| Cash on hand from last audit | $796 24 |
| Membership fees | 155 00 |
| Legislative grant | 2,750 00 |
| Advertisements | 93 50 |
| Prosecutions | 516 25 |
| Napanee cheese board | 200 00 |
| Kingston " | 200 00 |
| Factory fees from inspectors | 1 425 50 |
| Alfred dairy school | 10 00 |
| Total | $6. 46 49 |

### Expenditures.

| | |
|---|---|
| Expenses convention and regular meeting | $462 60 |
| Reporter | 75 00 |
| H. Ashley, ex-secretary | 100 00 |
| Grants to Industrial Fair and Fat Stock Show | 100 00 |
| Local committee meeting, Belleville | 27 36 |
| Officers' salaries | 130 00 |
| Directors' meeting, Toronto | 170 00 |
| Delegates, Montreal and Guelph | 75 00 |
| Printing | 103 00 |
| Sulphuric acid | 15 00 |
| Law costs | 135 20 |
| Inspector G. G. Publow, salary | 960 00 |
| Inspector A. P. Purvis, " | 780 00 |
| Inspector G. H. Bensley, " | 715 00 |
| Inspector H. Howey, " | 410 00 |
| Inspector W. W. Grant, " | 650 00 |
| Postage, stationery and telegraphing | 35 00 |
| Balance on hand | 1,203 33 |
| Total | $6,146 49 |

We hereby certify that we have examined the books and vouchers of Mr. P. R. Daly, treasurer Eastern Dairymen's Association, and find them correct in accordance with above statement.

Auditors, { Morden Bird. / F. W. Brenton.

## CREAMERIES' ASSOCIATION OF ONTARIO.

### Receipts.

| | |
|---|---|
| Cash on hand from previous year, as per last report | $179 47 |
| Members' fees | 53 50 |
| Donations | 2 00 |
| Legislative grant | 2,000 00 |
| Total | $2,234 97 |

### Expenditure.

| | |
|---|---|
| Grants to the societies, fairs, etc | $175 00 |
| Expenses for conventions or other meetings | 161 65 |
| Officers' salaries | 135 00 |
| Directors' fees and expenses | 157 25 |
| Printing | 11 75 |
| Advertising | 20 50 |
| Lecturers' expenses | 75 00 |
| Inspectors' salaries | 900 00 |
| Other expenses of inspectors | 371 45 |
| Cost of reporting | 80 00 |
| Total | $2,087 60 |
| Balance on hand | 147 87 |

Examined and found correct this 15th day of January, 1897.

R. J. Graham, Treasurer.

C. R. Cooper, / C. E. Whelihan, } Auditors.

BINDING SECT. AUG 2 3 1967